IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPELLANTS:	Katrin Reisinger	CONFIRMATION NO. 3984
SERIAL NO.:	10/797,494	GROUP ART UNIT: 3628
FILED:	March 10, 2004	EXAMINER: Daniel Vetter
TITLE:	APPARATUS FOR AUTOMATIC PRODUCT CODE ENTRY INTO A MAIL-PROCESSING DEVICE	

MAIL STOP APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPELLANT'S MAIN APPEAL BRIEF

S I R:

In accordance with the provisions of 37 C.F.R. §41.37, Appellant herewith submits her main brief in support of the appeal of the above-referenced application.

US005852813A

United States Patent [19]

Guenther et al.

[11] Patent Number: 5,852,813

[45] Date of Patent: Dec. 22, 1998

[54] **METHOD AND ARRANGEMENT FOR ENTERING DATA INTO A POSTAGE METER MACHINE**

[75] Inventors: **Stephan Guenther; Ralf Kubatzki,** both of Berlin, Germany

[73] Assignee: **Francotyp-Postalia AG & Co.,** Birkenwerder, Germany

[21] Appl. No.: **770,525**

[22] Filed: **Dec. 20, 1996**

[30] **Foreign Application Priority Data**

Dec. 22, 1995 [DE] Germany 195 49 305.2

[51] **Int. Cl.**[6] **G07B 17/00**

[52] **U.S. Cl.** **705/408**; 235/375; 283/71; 705/409; 705/410

[58] **Field of Search** 101/71; 235/375; 283/71; 395/117; 705/401, 408, 409, 410

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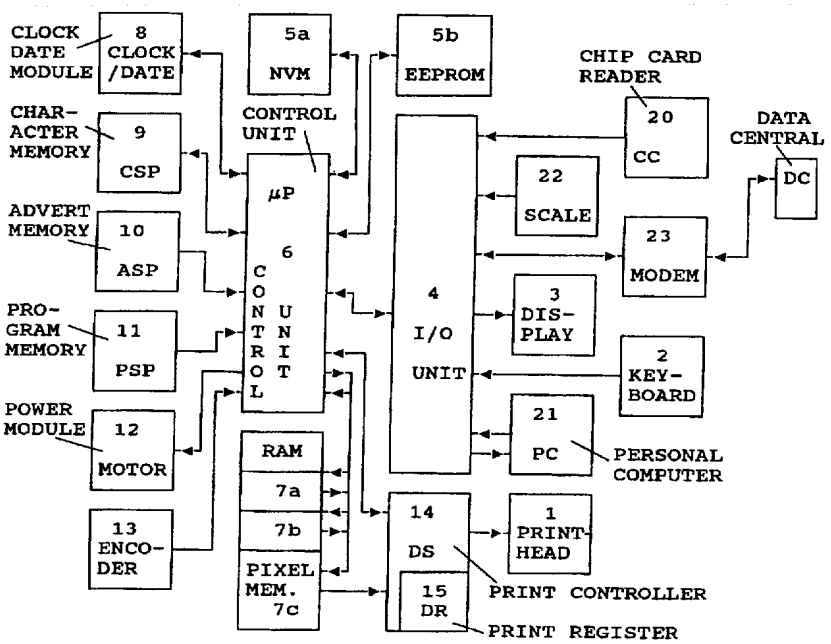
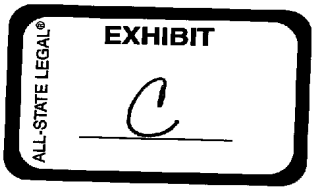
Primary Examiner—Edward R. Cosimano
Attorney, Agent, or Firm—Hill & Simpson

[57] **ABSTRACT**

In a method and to an arrangement for entering data into a postage meter machine, after calling stored setting data, a routine is triggered that includes a manual input routine. The arrangement includes specific actuation elements for data input for positioning, within the overall image, sub-images (image portions or constituents of the overall image). After interrogation of the actuated inputs, request data are formed if a non-available data set is needed. The formation likewise ensues when a microprocessor in the machine finds data of the clock/date module that were called but were modified due to the passage of time. A communication is then implemented, whereby the data central communicates sub-image data files and, if necessary, further data files to the postage meter machine on the basis of the communicated request data. As a result of the actuation of selected actuation elements, a corresponding sub-image positioning routine is triggered, whereby allowable change data are identified and lead to the modification of a control data file. The modification is displayed on the basis of another sub-routine as a cleartext presentation of the print image.

18 Claims, 11 Drawing Sheets





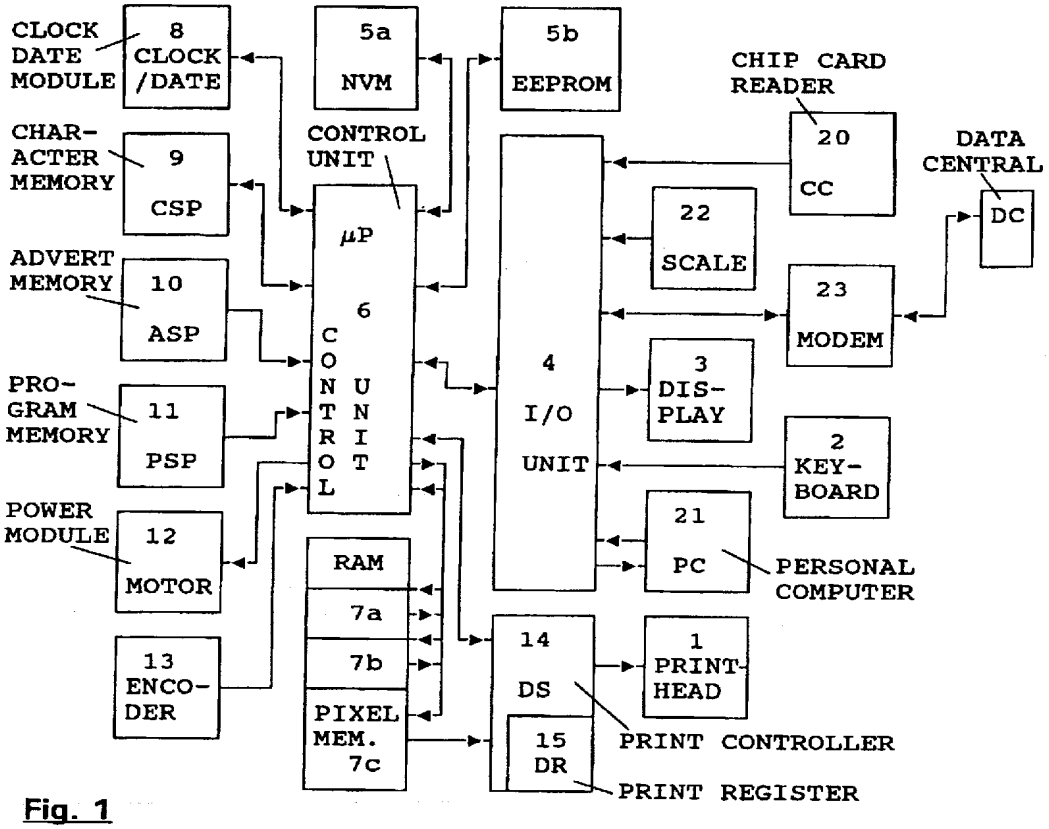


Fig. 1

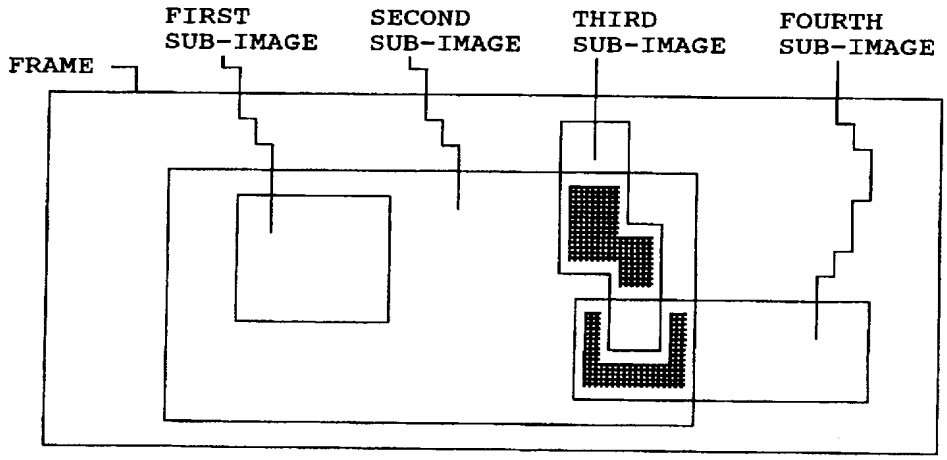


Fig. 7 INVERTED OVERLAPPING REGION

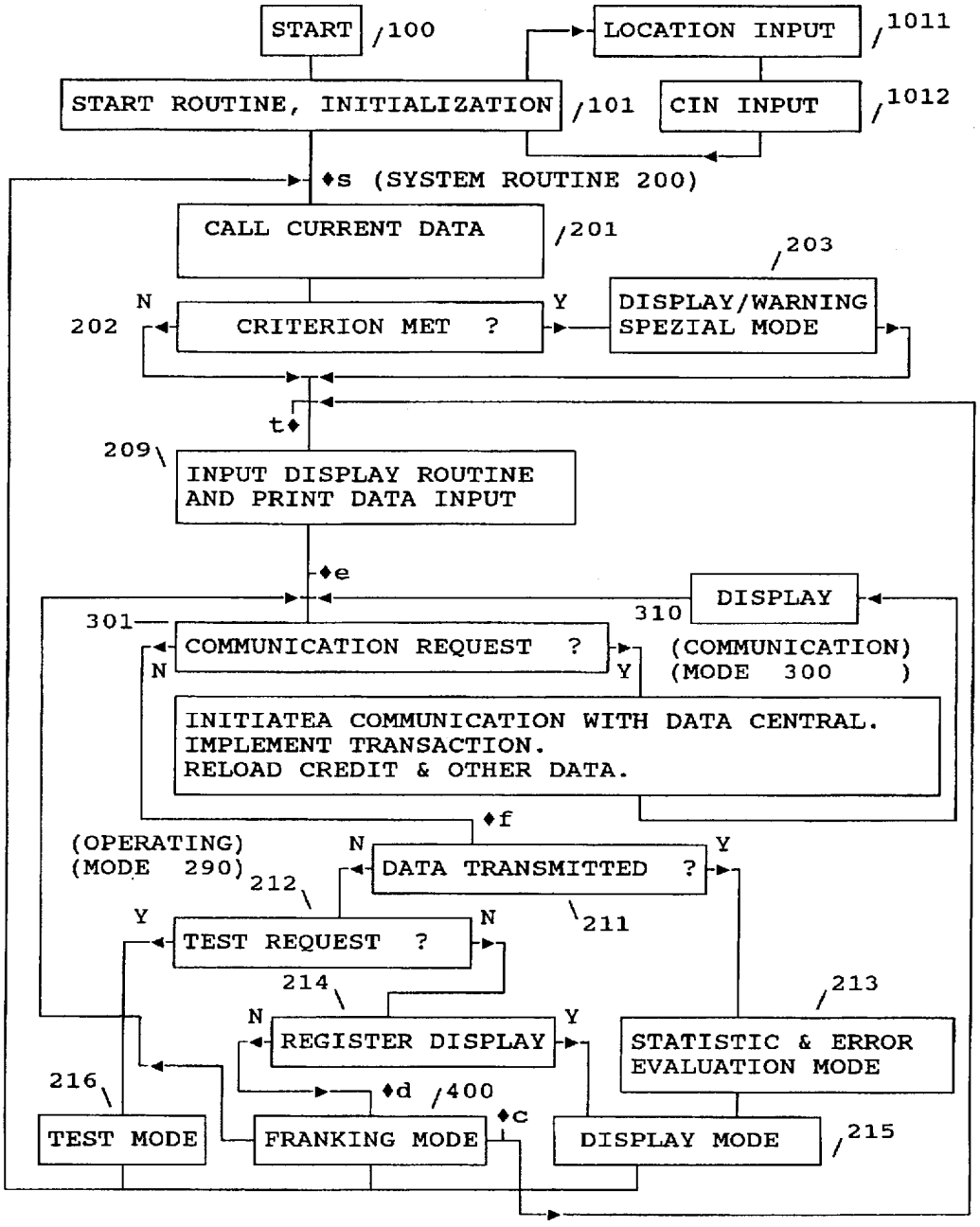

START
100
LOCATION INPUT
1011
START ROUTINE, INITIALIZATION
101
CIN INPUT
1012
♦s (SYSTEM ROUTINE 200)
CALL CURRENT DATA
201
203
N
202
CRITERION MET ?
Y
DISPLAY/WARNING SPEZIAL MODE
t♦
209
INPUT DISPLAY ROUTINE AND PRINT DATA INPUT
♦e
DISPLAY
310
301
COMMUNICATION REQUEST ?
N
Y
(COMMUNICATION) (MODE 300)
INITIATEA COMMUNICATION WITH DATA CENTRAL.
IMPLEMENT TRANSACTION.
RELOAD CREDIT & OTHER DATA.
♦f
(OPERATING) (MODE 290)
N
DATA TRANSMITTED ?
Y
212
211
Y
TEST REQUEST ?
N
214
213
N
REGISTER DISPLAY
Y
STATISTIC & ERROR EVALUATION MODE
216
♦d
400
♦c
TEST MODE
FRANKING MODE
DISPLAY MODE
215

Fig. 2

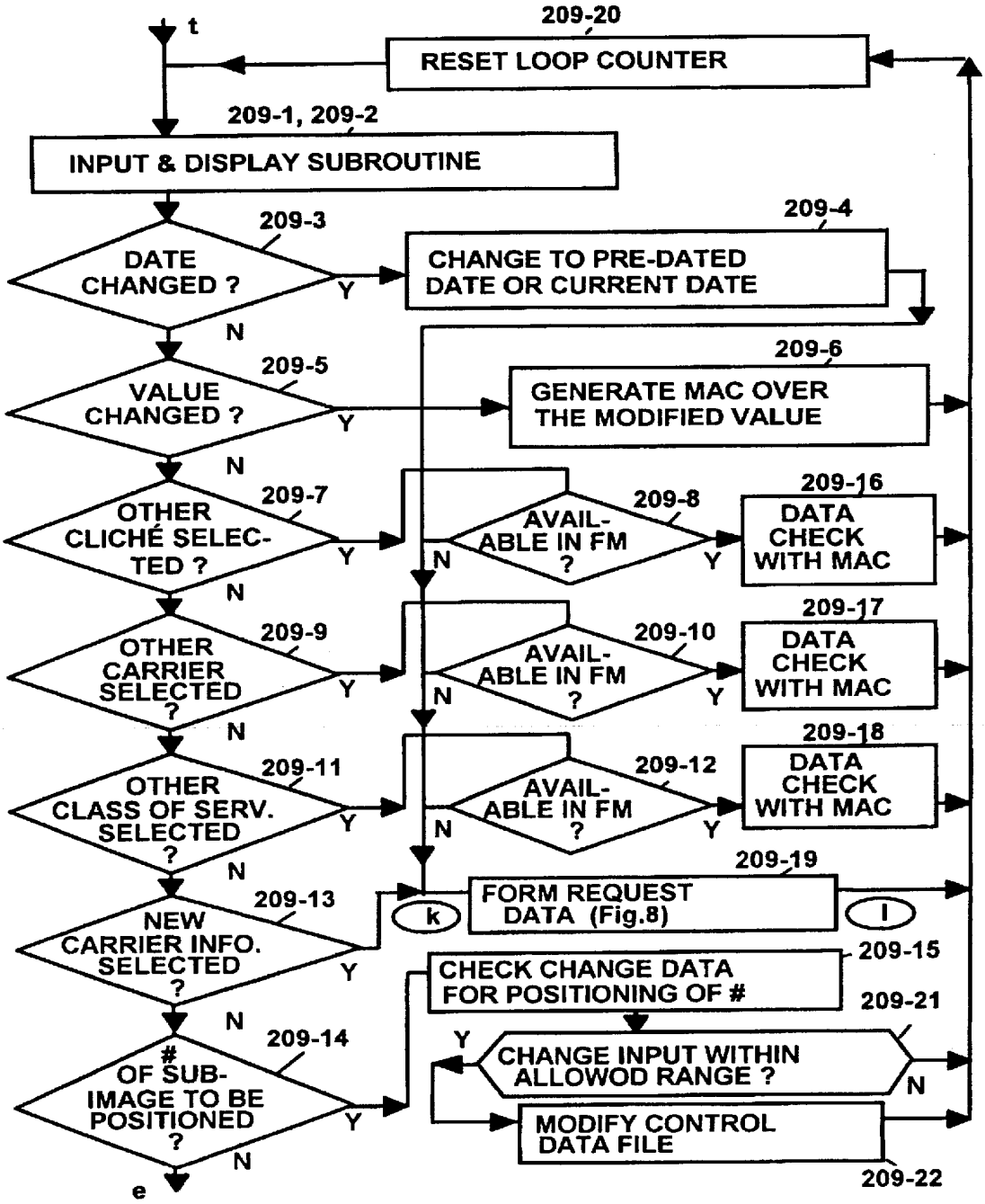

t
209-20
RESET LOOP COUNTER
209-1, 209-2
INPUT & DISPLAY SUBROUTINE
209-3
DATE CHANGED ?
Y
N
209-4
CHANGE TO PRE-DATED DATE OR CURRENT DATE
209-5
VALUE CHANGED ?
Y
N
209-6
GENERATE MAC OVER THE MODIFIED VALUE
209-7
OTHER CLICHÉ SELEC-TED ?
Y
N
209-8
AVAIL-ABLE IN FM ?
N
Y
209-16
DATA CHECK WITH MAC
209-9
OTHER CARRIER SELECTED ?
Y
N
209-10
AVAIL-ABLE IN FM ?
N
Y
209-17
DATA CHECK WITH MAC
209-11
OTHER CLASS OF SERV. SELECTED ?
Y
N
209-12
AVAIL-ABLE IN FM ?
N
Y
209-18
DATA CHECK WITH MAC
209-19
FORM REQUEST DATA (Fig.8)
k
l
209-13
NEW CARRIER INFO. SELECTED ?
Y
N
209-15
CHECK CHANGE DATA FOR POSITIONING OF #
209-21
209-14
OF SUB-IMAGE TO BE POSITIONED ?
Y
N
Y
CHANGE INPUT WITHIN ALLOWOD RANGE ?
N
MODIFY CONTROL DATA FILE
209-22
e

Fig.3

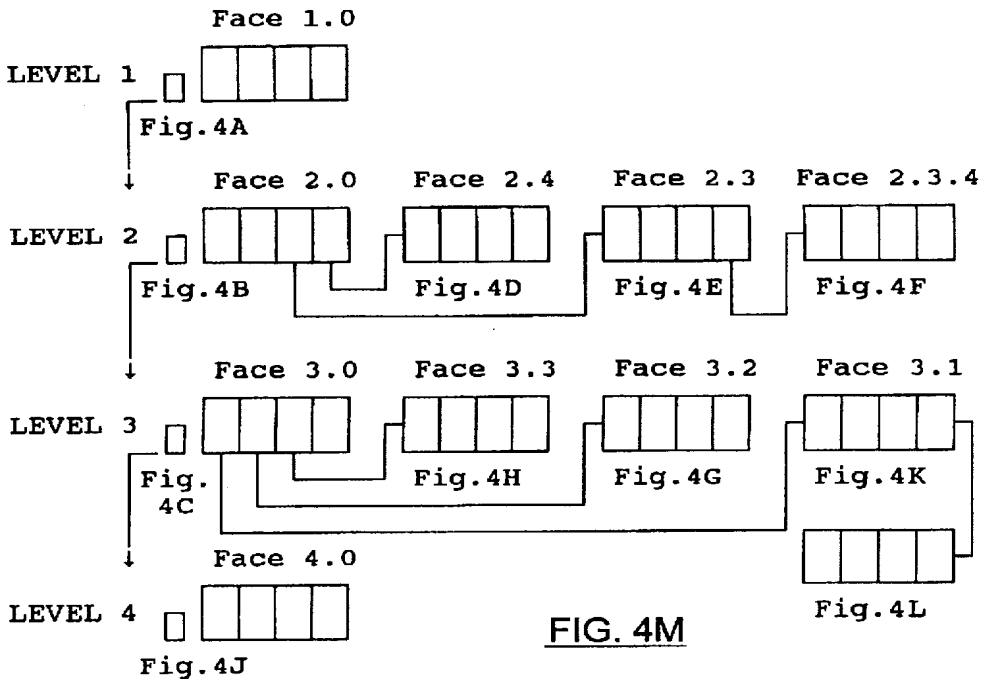


FIG. 4M

Field 1	*Field 2*	*Field 3*	*Field 4*
TYPE OF MAILING	ADVERT. SLOGAN	DATE	POSTAGE VALUE
AIR MAIL	No.1	1.5.92	0100

Fig. 4A

Field 1	*Field 2*	*Field 3*	*Field 4*
TAPE No.	COST CENTER	* PO.COM-PUTER ON * PO.C. OFF * FREQUENCY * PRIORITY	REGISTER
001	Nummer	* SELECTION	

Fig. 4E Fig. 4D

Fig. 4B

Field 1	*Field 2*	*Field 3*	*Field 4*
STAMP OFFSET * 20 mm * MODIFY	REMOTE VALUE SETTING	MODIFY COST CENTER	HIGHER VALUE 0500
↓ Fig. 4K	↓ Fig. 4G	↓ Fig. 4H	

Fig. 4C

	Carrier 1	Carrier 2	Carrier 3
REMAINING AMOUNT	1.000,-		
USED	1.000,-		
CREDITED	2.000,-		

Fig. 4D

SERVICE	ADVERT. CLICHE	POST MARK	CARRIER LOGO
TOWARD LEFT RIGHT OMITTED	TOWARD LEFT RIGHT OMITTED	TOWARD LEFT RIGHT OMITTED	TOWARD LEFT RIGHT OMITTED
SUB-IMAGE1 SUB-IMAGE2 SUB-IMAGE3 ... #SUB-IMAGE	SUB-IMAGE1 SUB-IMAGE2 SUB-IMAGE3 ... #SUB-IMAGE	SUB-IMAGE1 SUB-IMAGE2 SUB-IMAGE3 ... #SUB-IMAGE	SUB-IMAGE1 SUB-IMAGE2 SUB-IMAGE3 ... #SUB-IMAGE
TEXT PART1 TEXT PART2 #TEXT PART	TEXT PART1 TEXT PART2 #TEXT PART	TEXT PART1 TEXT PART2 #TEXT PART	TEXT PART1 TEXT PART2 #TEXT PART
↓ Fig. 4L	↓ Fig. 4L	↓ Fig. 4L	↓ Fig. 4L

Fig. 4K

SERVICE	ADVERT. SLOGAN	POST MARK	CARRIER LOGO
# PART	# PART	# PART	# PART
TOWARD → ← ↓ ↑	TOWARD → ← ↓ ↑	TOWARD → ← ↓ ↑	TOWARD → ← ↓ ↑
OMITTED EDIT	OMITTED EDIT	OMITTED EDIT	OMITTED EDIT

Fig. 4L

Field 1	*Field 2*	*Field 3*	*Field 4*
SCALE TERMINAL	MANUAL WEIGHT INPUT	AUTOMATIC WEIGHT INPUT	CARRIER 1 CARRIER 2 ... INFO NEW INPUT

↓
Fig. 4F

Fig. 4E

Field 1	*Field 2*	*Field 3*	*Field 4*
TYPE	FORM	DESTI-NATION	WEIGHT
↑	↑	↑	↑
POST CARD LETTER PACKAGE PRINTED MATTER GOODS BOOKS	NORMAL REGISTERED EXPRESS PRIORITY RETURN RCPT. VALUE AIR MAIL	DOMESTIC EUROPA FOREIGN1 FOREIGN2 FOREIGN3	20 50 100 250 500 750

Fig. 4F

Feld 1	*Feld 2*	*Feld 3*	*Feld 4*
ACTIVATE	SET	ABORT	

Fig. 4G

Feld 1	*Feld 2*	*Feld 3*	*Feld 4*
DELETE COST CENTER NAME	PRINT COST CENTER NAME	ALIAS NAME	HIGH VALUE 0500

Fig. 4H

Feld 1	*Feld 2*	*Feld 3*	*Feld 4*

Fig. 4I

Feld 1	*Feld 2*	*Feld 3*	*Feld 4*
SERVICE	USER INTERFACE		

Fig. 4J

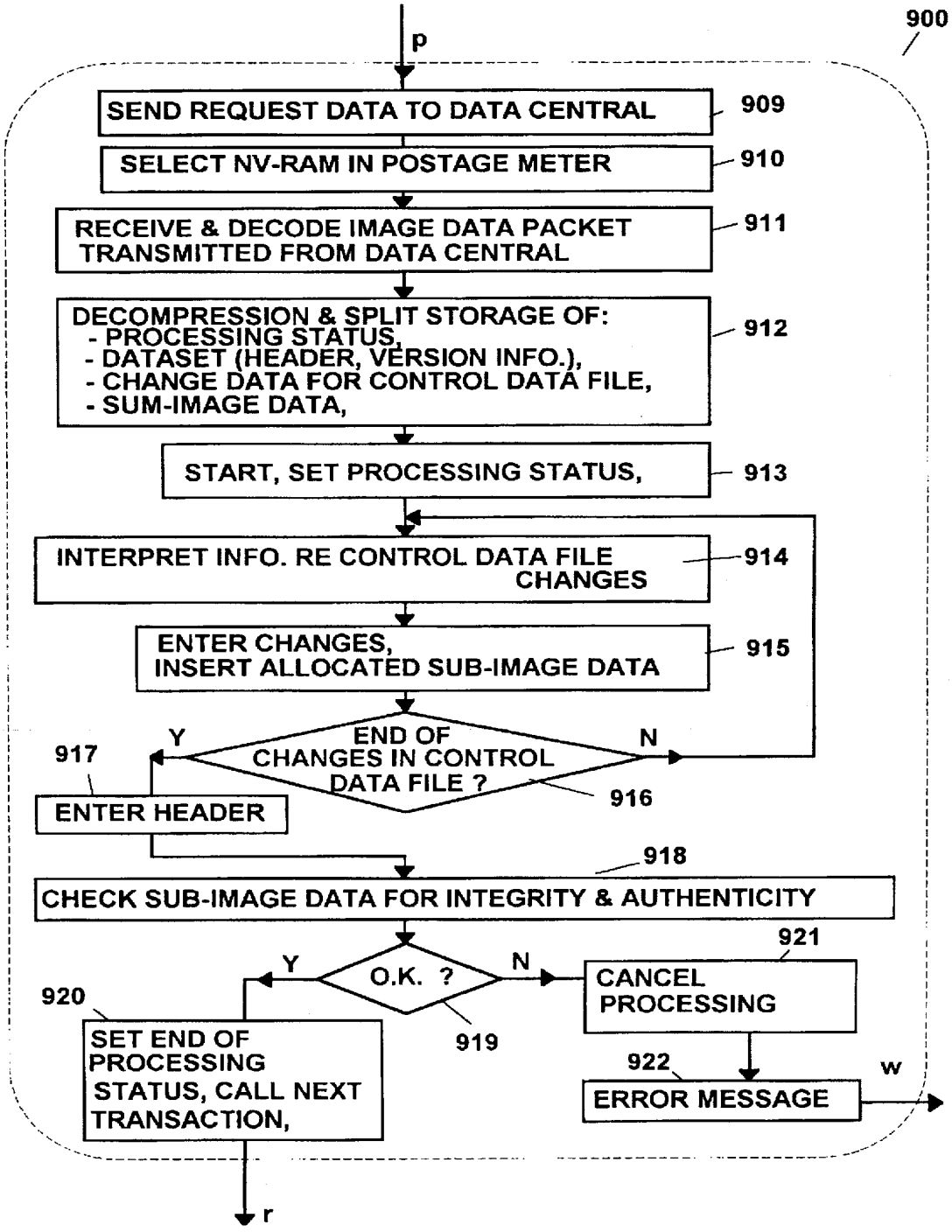

900
p
SEND REQUEST DATA TO DATA CENTRAL
909
SELECT NV-RAM IN POSTAGE METER
910
RECEIVE & DECODE IMAGE DATA PACKET TRANSMITTED FROM DATA CENTRAL
911
DECOMPRESSION & SPLIT STORAGE OF:
- PROCESSING STATUS,
- DATASET (HEADER, VERSION INFO.),
- CHANGE DATA FOR CONTROL DATA FILE,
- SUM-IMAGE DATA,
912
START, SET PROCESSING STATUS,
913
INTERPRET INFO. RE CONTROL DATA FILE CHANGES
914
ENTER CHANGES, INSERT ALLOCATED SUB-IMAGE DATA
915
END OF CHANGES IN CONTROL DATA FILE ?
916
Y
N
917
ENTER HEADER
918
CHECK SUB-IMAGE DATA FOR INTEGRITY & AUTHENTICITY
O.K. ?
919
Y
N
920
SET END OF PROCESSING STATUS, CALL NEXT TRANSACTION,
921
CANCEL PROCESSING
922
ERROR MESSAGE
w
r

Fig. 5

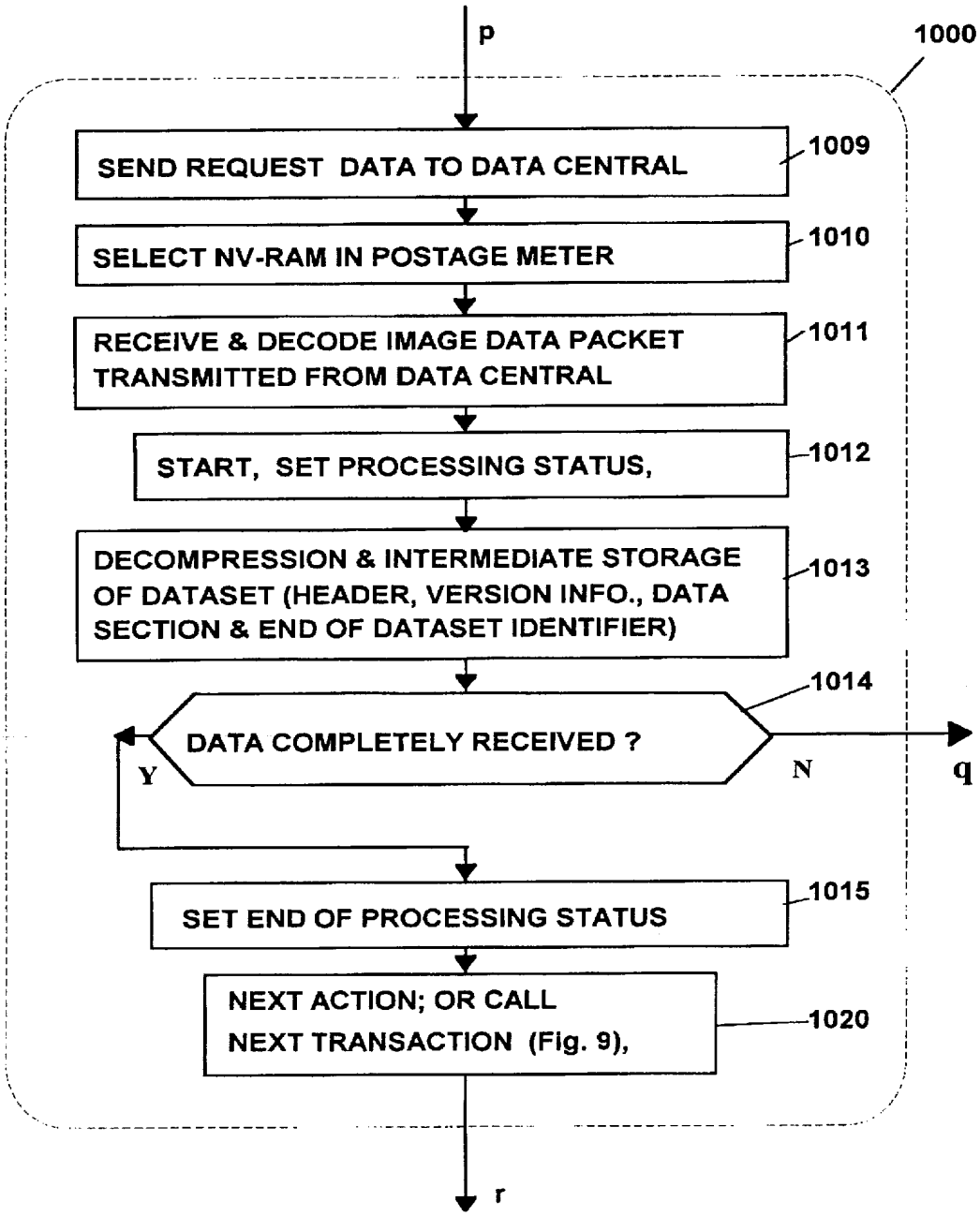

p
1000
SEND REQUEST DATA TO DATA CENTRAL
1009
SELECT NV-RAM IN POSTAGE METER
1010
RECEIVE & DECODE IMAGE DATA PACKET TRANSMITTED FROM DATA CENTRAL
1011
START, SET PROCESSING STATUS,
1012
DECOMPRESSION & INTERMEDIATE STORAGE OF DATASET (HEADER, VERSION INFO., DATA SECTION & END OF DATASET IDENTIFIER)
1013
DATA COMPLETELY RECEIVED ?
1014
Y
N
q
SET END OF PROCESSING STATUS
1015
NEXT ACTION; OR CALL NEXT TRANSACTION (Fig. 9),
1020
r

Fig. 6

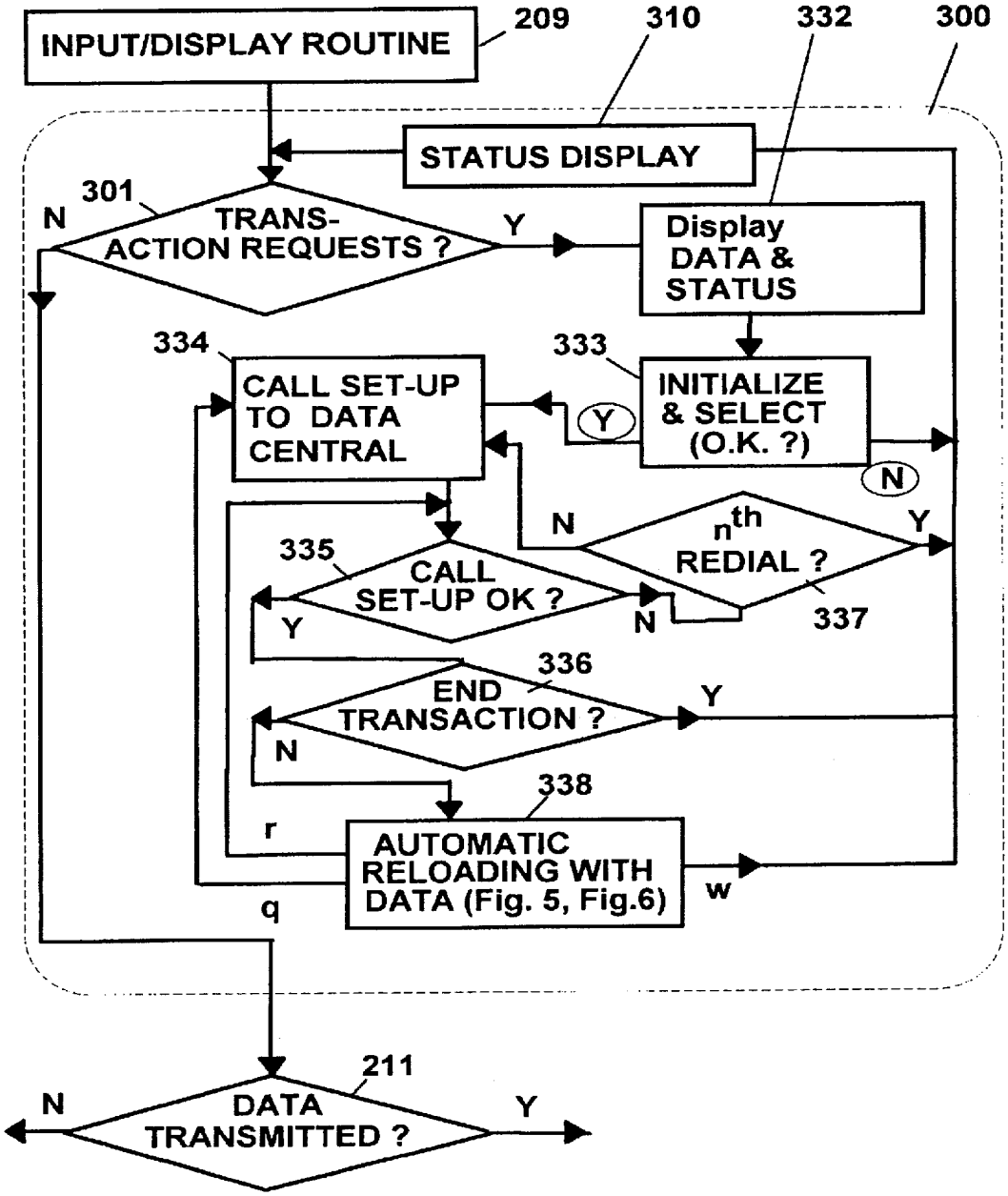

INPUT/DISPLAY ROUTINE
209
310
332
300
STATUS DISPLAY
301
N
TRANS-ACTION REQUESTS ?
Y
Display DATA & STATUS
334
CALL SET-UP TO DATA CENTRAL
333
INITIALIZE & SELECT (O.K. ?)
Y
N
N
nth REDIAL ?
Y
335
CALL SET-UP OK ?
Y
N
337
336
END TRANSACTION ?
Y
N
338
r
AUTOMATIC RELOADING WITH DATA (Fig. 5, Fig.6)
w
q
211
N
DATA TRANSMITTED ?
Y

Fig. 9

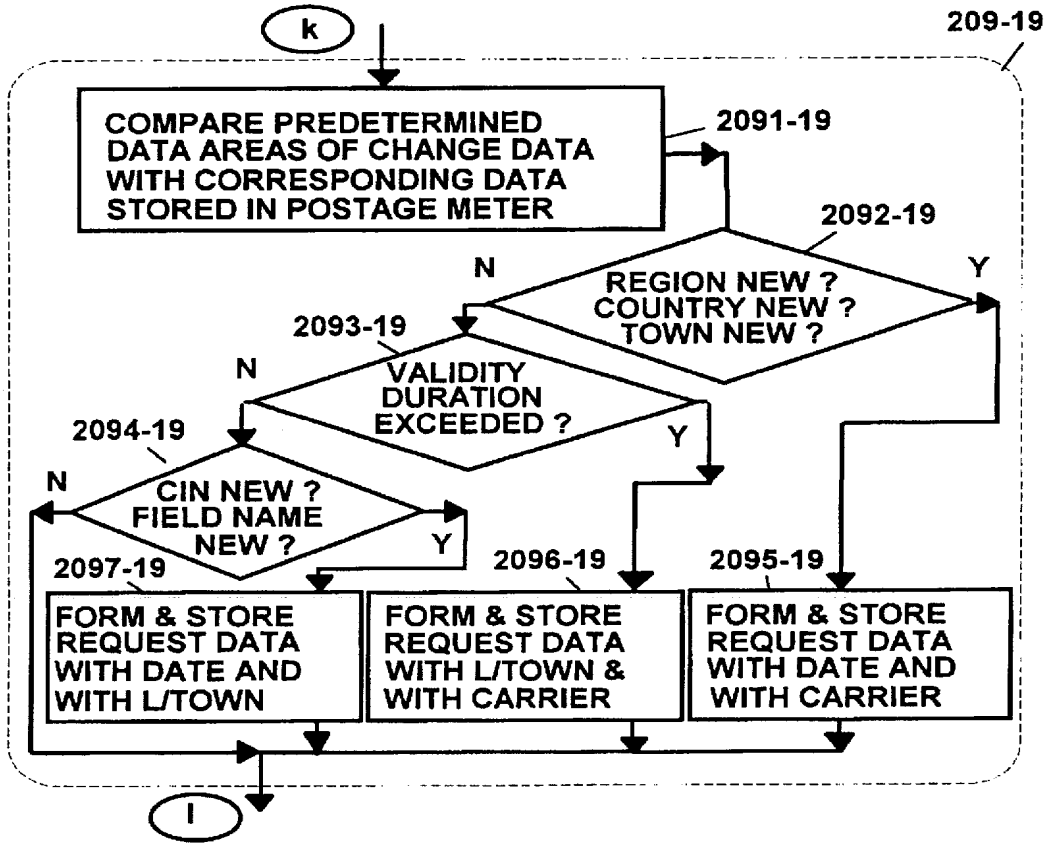

k
209-19
COMPARE PREDETERMINED DATA AREAS OF CHANGE DATA WITH CORRESPONDING DATA STORED IN POSTAGE METER
2091-19
2092-19
REGION NEW ? COUNTRY NEW ? TOWN NEW ?
N
Y
2093-19
VALIDITY DURATION EXCEEDED ?
N
Y
2094-19
CIN NEW ? FIELD NAME NEW ?
N
Y
2097-19
FORM & STORE REQUEST DATA WITH DATE AND WITH L/TOWN
2096-19
FORM & STORE REQUEST DATA WITH L/TOWN & WITH CARRIER
2095-19
FORM & STORE REQUEST DATA WITH DATE AND WITH CARRIER
I

Fig. 8

METHOD AND ARRANGEMENT FOR ENTERING DATA INTO A POSTAGE METER MACHINE

BACKGROUND OF THE INVENTION

The invention is directed to a method for entering data into a postage meter machine and to an arrangement for implementing the method.

DESCRIPTION OF THE PRIOR ART

A postage meter machine is utilized for franking postal matter and can be equipped with a control unit, a memory, an input arrangement, a MODEM or other data reception means, an input/output control unit, a display means and a printer. For example, a stationary printer prints the franking impression column-by-column while a letter is conveyed past the printer. A printing width of approximately one inch is thereby achieved.

Given a known postage meter machine of Francotyp Postalia AG of this type such as, for example, model T1000, a number is allocated to every advertising slogan electronically stored in the machine. After the selection of the number with a key, a function key for the function of setting the slogan is actuated in order to modify the advertising slogan according to the selected number. A number of advertising slogans are stored in a user memory ASP that, for example, can be implemented as a plug-in EEPROM. When there is a change in the user of a rented postage meter machine, consequently, the EEPROM must be reprogrammed at the manufacturer or must be replaced by another customized user memory ASP. This method, which is already time-consuming, is also preceded by an authorization procedure for a change in slogan.

German OS 37 12 100 A1 discloses that a message input keyboard be provided in order to modify the advertising message in the memory. On the other hand, the postage meter machine is in communication with a data central via a modem in order to receive advertising messages from the central. The authorization procedure for a change in slogan is thus displaced to the data central. The advertising message stored in the memory of the postage meter machine can only be modified as a whole. Particularly when analog communication services are used, faulty transmissions can lead to image errors in the slogan. The method is thus not suitable for communicating critical image features employable for a security imprint that are to be interpreted during a security check.

In known postage meter machines such as, for example, described in European Application 660 269, a credit can be loaded on demand via a modem. A prerequisite for a recrediting, however, is that an identification number was previously entered into the postage meter machine and that a register inquiry and check by the data central has ensued.

A character printing authorization system is disclosed in German OS 38 23 719 that contains a number of character patterns and associated addresses stored electronically. Since this storing is undertaken in combination with recrediting and chronologically precedes the franking, no large data sets need be communicated for franking for protecting the imprint against manipulation by a modification of the character pattern. Only the address of the character pattern together with an appertaining date then need be loaded into the postage meter machine from the data central. The postage meter machine is thereby authorized to automatically undertake a selection of character patterns corresponding to the date. The appearance of the imprint, however, is

modified at times that are not subject to control by the user. The user cannot make any selection among various images for a franking imprint.

When the postage meter machine contains a postage computer, weight data are entered via the scale. European Application 566 225 discloses a method for data input into a postage meter machine for such a system that employs chip cards or a cellular communication network in order to enter fee schedule changes. Such chip cards, which contain a number of non-volatile memories or memory areas that can be separately accessed and a microprocessor, are successively plugged into a single write/read unit in order to serially transmit data representing different types of information into the postage meter machine. The data stored in the postage meter machine can be accessed during the operation thereof. It is also advantageous that the particular type of usage of the postage meter machine influences the data which fill its memory. The tabular data stored therein are thus determined by the use of the postage meter machine. The necessity of storing all data in the postage meter machine from the outset is thus eliminated, since at least some of the data can be subsequently transmitted when needed. All data, however, that could be requested by one of the postage meter machines must be pre-processed by the data central regardless of whether all data are used or communicated later. The high outlay is disadvantageous, particularly as arises during image processing in preparation of the service when franking images are to be produced for many different mail carriers. Most postage meter machines, of course, are of an older type and cannot process this amount of information. Such an outlay on the part of the data central also is not justified when only a few users access such services and the economic feasibility is thus not assured.

U.S. Pat. No. 5,233,657 discloses a telefax device with a franking capability, whereby franking image data are communicated to the receiver on demand so that a piece of mail can be franked with a corresponding imprint using communicated franking image data that are stored in the terminal equipment. The user can switch his terminal equipment between telefaxing and franking, the advantage being that the terminal station telecommunication port (hook-up) and the terminal station equipment telecommunication equipment can be used for both functions. A disadvantage, however, is that the solution cannot be simply transferred to a system in which the postage meter machine contains a postage computer for a number of mail carriers. It is difficult for future mail carriers to guarantee an option for incorporation into the operation of the postage meter machine because details about the type of service or about the calculating need are not known in advance. A solution must thus be created with which at least a part of the data can be subsequently transmitted in order to adapt the operating mode to the new demands. Given a number of mail carriers, there is an initial requirement with respect to distinguishing the mail carriers from one another via the imprint on the letter. The corresponding identifying logos/characters for different mail carriers would have to be loaded.

When only image parts of the franking image are transmitted from the central to the terminal equipment and these image parts stored in the terminal equipment are then completed to form an overall franking image, however, the individual, stored image parts must correspond to a limited part of the entire image. Future logos of mail carriers that, due to their shape, do not fit into a limited part of the entire image would already have to be correspondingly reduced in size in the data central. The legibility of alphanumerical

characters can only be guaranteed when the resolution of the printed image is high. Such printers, however, are expensive. Moreover, no uniform height of written characters can be realized in the case of enlarged (expanded) image/text parts; this, however, would be required for an automatic image interpretation at the Post Office, particularly for security imprints.

SUMMARY OF THE INVENTION

An object of the present invention is eliminate the aforementioned disadvantages of the above-discussed known techniques and to create a more flexible system that can be expanded to future services and mail carriers.

A method entering current data into a postage meter machine should be developed, whereby the current data include sub-image data (i.e., data constituting only a portion of the overall image) for future stamp images. The data entry should be based on a broad use of communication technology and should be implementable in an economical fashion. An additional object is to support the selection of favorable mail carriers by making use of the services of the data central.

The invention has the further object of providing for data entry into a postage meter machine in a manner protected against manipulation in an uncomplicated way for a number of users. Moreover, the method should be suitable for the communication of critical image features employable for a security imprint, these image features to be interpreted in a security check.

A more interactive possibility for the user of the system to collaborate in the design of the stamp image is to be created. A method for insertion of sub-image data for producing an overall pixel image for a franking stamp in which sub-images can also be interleaved among one another should be created for this purpose.

A further object is to provide a mail processing system that includes external devices in a postage meter machine and that can be optionally supplied with updating data from a data central via a communication connection or via alternative transmission means, whereby the call setup for the purpose of communication ensues decentrally from the mail processing system.

The arrangement for entering data into a postage meter machine should allow simple operation in the selection of favorable mail carriers and in the positioning of sub-images within certain limits.

The invention is based on the concept of updating predetermined image data and program parts in the postage meter machines via a reception means such as, for example, a modem terminal or a reception means for a mobile or telephone network and of realizing an automatic insertion of sub-image data for producing an overall pixel image for a franking stamp.

The method for entering data into a postage meter machine is based on a defined loading of data and includes the following steps:

- initializing a postage meter machine;
- calling non-volatilely stored setting data for entering the printing data into the postage meter machine;
- implementing a routine that includes sub-routines for input, for forming request data, for automatic print data input and checking as well as for display;
- implementation of a communication with a remote data central, whereby sub-image data files and possibly further data files, are transmitted to the postage meter machine on the basis of the request data communicated from the data central; and
- implementing an updating, including a sub-routine for automatic positioning of sub-images during the aforementioned communication, and a sub-routine leading to the modification of a control data file.

An overall stamp image of a franking device includes the pixel image for a franking stamp image and at least one further pixel image for a further stamp image and also inventively includes pixel image patterns for stamp sub-images that modify the appearance of the overall pixel image. Each of the stamp images is composed of combined sub-images. The combination is stored in a control data file. The sub-images can also be components of an image data file in the control data file. An image data file or a sub-image data file of an image data file respectively forms the fixed image frame for a stamp image. In addition, picture element data files are stored that, correspondingly called by the control data file in a microprocessor-controlled printing process, yield a pixel image. Every other stamp image is generated in exactly the same way and is advantageously provided for the presentation of further information such as type of mailing (selective imprint), advertising slogan, mail carrier recognition features and for routing information, to the date and to the name of the municipality.

In addition to regions with fixed positioning of variable and semi-variable stamp sub-image data relative to fixed stamp image frame data, regions with variable positioning are also inventively provided. Graphically displayed, such regions would appear as frame or as window in the stamp image frame but with substantially larger dimensions than would normally be required for the window image data to be inserted. The window image data to be inserted can be displaceably positioned within the window or region with variable positioning given simultaneous display. Storage of the new data set corresponding to the repositioning ensues after the display. As needed, a print-out of a modified stamp image or of an overall stamp image can then ensue.

Whereas parts of the overall stamp image such as the stamp image parts of franking stamp with the logo of the mail carrier, postage stamp, advertising slogan stamp and selective printing stamp dare normally not overlap, the only thing of concern given some sub-images such as, for example, data in the postage stamp or text line in the advertising slogan is the legibility. A predetermined position thus need not necessarily be adhered to unless it is a matter of machine-readable data within a security imprint that are to be automatically interpreted in the Post Office. Since the carrier is to perform a service paid for by the customer, a n automatic evaluation at the carrier (Post Office) can thereby reduce the costs of the service.

Moreover, the invention is based on the recognition that the allocation of the mail to a specific carrier is usually manually undertaken by the postage machine user himself by pre-sorting, particularly since some carriers honor such a service and allow corresponding discounts. In this respect, the customer already produces a type of service that can be inventively expanded to another type in order to obtain the benefit of discounts. The slogan or stamp image modified by the customer can be displayed in the display and can be brought to the attention of the mail carrier after a separate print-out and if approved, the mail carrier then grants authorization before the modified slogan or stamp image is utilized by the customer. Inventively, the technical conditions are created so that the customer of the carrier can introduce his creativity or at least has a possibility of collaboration that was hitherto not standard.

An advantage of the invention is that the potentially greater variety of the slogan or stamp images contributes to improving competition. Thus, one can quickly collaborate with new mail carriers in the marketplace because it is possible for the user to modify the slogan or stamp image. This can lead to cost advantages for the user of such a postage meter machine that can be quickly reset in this way to new demands.

Another advantage arises given employment of regionally different, valid fee schedules of the same schedules of the same mail carrier because the regionally-specific sub-image can be positioned in the slogan/stamp image or in some other stamp image for making the aforementioned application clear.

A further advantage is that the new combination of sub-images, as a signature substitute, can assure authenticity when a predetermined number of frankings for which a specific combination of sub-images is to be employed is agreed upon with an authorization office of the mail carrier. A unique image part already assures that a combination of sub-images with this image part is likewise unique.

An authorization procedure for a change of logo or slogan is assumed for various mail carriers. The frame is thereby defined, as well as those regions in the stamp image which are permanently described and together with other regions in the stamp image which can be variably fashioned. Various logos are already in use in the Deutsche Post AG, for example an open posthorn (new), a closed posthorn (old), these requiring only a little space in the postage stamp image. The spacing between the postage stamp image and the data stamp image can be reduced for larger, future logos. The postage stamp image includes the name of the mail carrier and its logos, the postage value and at least a part of the postage meter machine serial number and, potentially, a reference to the postage meter machine manufacturer and machine model. The data stamp image includes the date, the place name of the Post Office and, potentially, a reference to the postage meter machine manufacturer. Such a decentralized compilation of the stamp image enables greater flexibility for the user and reduces the outlay that the data central must otherwise perform in order to produce a new stamp image. The data central only communicates critical sub-image data, for example, a filled-in (solid) posthorn for a carrier logo as a replacement for an unfilled (outlined) posthorn and leaves the positioning thereof to the user. One component of future franking sub-image data can, for example, be a code or the written (clear text) name of the mail carrier that possibly likewise must be positioned in a predetermined region. In the aforementioned version, the modification data set for the corresponding control data file is stored in the postage meter machine, this defining the positioning regions. In another version, a corresponding control data file is transmitted to the postage meter machine by a communication connection together with the aforementioned, critical franking sub-image data and is then stored. It is provided that at least some of the boundaries of the image parts overlap, with the data central supplying at least one sub-image data file. It is advantageous for reasons of transmission and security systems when the appertaining image parts are split into protected sub-images. All sub-image data are stored encoded before the transmission and/or compilation or are additionally provided with an encoded checksum. A decoding ensues in the postage meter machine or a checksum is formed from the communicated data and is compared to the communicated checksum. This enables a manipulation-proof data entry.

The postage meter machine is inventively equipped with actuation means that allow a positioning of individual image parts within those regions in the stamp image that are allowed to be variably fashioned.

The greater flexibility at the user is also based on the fact that the pixel images can be regenerated from constant frame image data and variable window image data without a previously stored overall pixel image having to be present in the postage meter machine.

The sub-images sent from the central are stored in the non-volatile memory of the postage meter machine and are then capable of fundamentally modifying the appearance of the franking imprint in predetermined regions in combination with the setting of a specific position. Regions with little informational content can then be enhanced with informational content. Such informational contents form sub-images that, as needed, are selected by the user via a keyboard or shifted relative to one another within certain limits and/or are interleaved with one another. A legible entry can also be subsequently incorporated into a finished slogan in this way. The sub-images can intersect, whereby they overlap or reside on top of one another (stamp effect). The patterns can potentially be inverted in the overlapping regions in order to guarantee maximum legibility.

An advantage of such a postage meter machine is that it can also be utilized as a fee stamp, whereby the stamp can be arbitrarily positioned as needed in the boundaries of the franking image frame before the imprint ensues.

The postage meter machine is inventively equipped with actuation means which can be actuated as a reaction to a message communicated over a communication connection in order to make use of a service of the data central. Each subscriber or user of the mail processing system, for example, receives a message from the data central regarding what will change in the near future with respect to predetermined, relevant data contents and is thus able to implement the corresponding data updating when the updating data become valid. In case of message about a newly offered service of the data central or in the case of advertising, the service of the data central is cost-free. In the case of a fee-incurring service, the message also includes data pertaining to the price, whereby the message is communicated cost-free from the data central to the user during a communication ensuing, for example, for recrediting. The service can be an information about the most beneficial mail carrier for the respective user and, as needed, can include the communication of sub-image data and control data for the corresponding logo and of fee schedule data.

In a version with remote data transmission, for example by modem, and communication of the location, from the local switching center, there is also an automatic input possibility. After the activation in a sub-step of the initialization step, a communication requirement is formed. Controlled by the postage meter machine, an automatic offering of data for the postage meter machine ensues after it is turned on.

The inventive solution thus allows a change in location to be unproblemmatically undertaken without requiring delivery of a module for new postage fee table memories or requiring the dispatching of a service technician. Considerable costs for re-equipping, particularly of leased systems, are thereby advantageously saved.

The location-specific offering of data ensues, for example with a card-like transmission means or with an external memory via communication network (modem, mobile telephone, ISDN and other digital networks). Modern telephone and mobile radio telephone services allow the data central to undertake an identification of location in a short time in order to be able to automatically communicate the respective, location-specific data.

Advantageously, the input means (chipcard, telephone or, respectively, communication means) present in the postage meter machine are utilized. An advantage of the inventive solution in the mobility for a mail processing system, whereby the change in place can be registered in the data central.

The transportable postage meter machine arrangement recognizes the changing conditions and enters into a communication connection with an external memory either on its own or after an appropriate input and automatic recognition of an updating requirement. The postage meter machine then controls the data transmission. A solution is advantageously created for allowing loading into the system of an appropriate logo for a mail carrier (USPS, UPS, Deutsche Post AG or others) and the valid fee schedule of the respective carrier as well as the location without having to intervene mechanically into the system or requiring with a service technician.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block circuit diagram of a postage meter machine constructed and operating in accordance with the principles of the present invention.

FIG. **2** is an overall flowchart for the operation of the postage meter machine of FIG. **1**.

FIG. **3** is a flowchart for data input for the postage meter machine of FIG. **1**.

FIG. **4** shows a display structure for the postage meter machine of FIG. **1**.

FIGS. **4A–4M** illustrate displays in the individual fields in accordance with the invention.

FIG. **5** is a flowchart for a routine for handling communicated sub-image data in the postage meter machine of the invention.

FIG. **6** is a flowchart for a routine for handling communicated service data in the postage meter machine in accordance with the invention.

FIG. **7** illustrates the positioning of image parts in a postage meter machine in accordance with the invention.

FIG. **8** is a flowchart for forming the request data in accordance with the invention.

FIG. **9** is a flowchart for the communication mode for the inventive postage meter machine in order to implement a data transmission.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The block circuit diagram of FIG. I illustrates a postage meter machine equipped with a modem **23**, a chipcard write/read unit **20** and another data entry (reception or manual input unit **21**, such as a PC, and (if desired) a scale **22**. The postage meter machine has a programmable processor system.

These input and output means in the postage meter machine housing, plus a keyboard **2** and a display **3**, are connected via an input/output control unit **4** to a processor system containing a postal security region. These connections can ensue directly or via a bus (not shown). The processor system is composed of a memory formed by at least one of a non-volatile memory **5***a* and/or an EEPROM **5***b*, a time/date module **8**, and a processing unit (CPU) functioning as a control unit **6**. The processor system may also include special circuits and/or program means such as components of a program memory **11** and a battery-supported, non-volatile memory (CMOS-NV-RAM) in the time/date module **8** and/or a non-volatile memory EEPROM in the memories **5***a* and **5***b*. A print controller **14** is fashioned, for example, as an ASIC and is preferably adapted to cause a printer **15** to execute a non-contacting printing process.

In another version the input/output control unit **4** includes the print controller **14** to which a printhead **1**, the keyboard **2** and reception means (such as described above) for transmitted data, with the input/output control unit **4** being in communication with the control unit **6** of the postage meter machine via a bus.

The memories are usually composed of a number of permanent and temporary non-volatile memories. Together with the control unit **6**, a part of the overall memory arrangement forms a protected postal region within the processor system. A permanent program memory **11** of the memory arrangement of the postage meter machine contains programs for a communication via interfaces in the input/output control unit **4** with the input means (collectively the chipcard read/write unit **20**, the PC **21**, the scale **22** and the modem **23**). The input means produce the connection to external memories (data sources).

The memory arrangement also includes an advertising data memory **10** for storing a slogan, cliche'or the like and a character memory **9**. A main working memory is divided into memory regions **7***a*, **7***b* and **7***c*, region **7***c* being a pixel memory.

The base of the postage meter machine is composed of a printhead **1** and power module **12** (electronics/sensor/actuator module) that contains an energy supply and control for the drives (paper transport, printer, and, tape dispenser) or and includes the required drive motor. Operation of the printhead may be coordinated with the article conveyor by means of an encoder **13**, if necessary. As noted earlier, further peripheral input/output means can also be connected to the processor system. This may be, for example, a personal computer (PC) **21** including a picture screen and keyboard. The printhead I and the power module **12** in the base are coupled via appropriate interfaces with the components of processor system directly and/or via the input/output control unit **4**.

The postage meter machine has a reception means or such as an external modem **23** and an associated modem interface in the postage meter machine, or an internal modem. A communication with a remote data central DC is enabled via modem. In one version, a telecommunication network is provided that externally contains a memory with the fetchable data and/or flags for subsequent loading of auxiliary functions and information into the postage meter machine.

Alternatively, an external memory with updating data can be provided in a mobile telephone communication network and can be addressed by a corresponding communication connection and communication means. Assuming an intermediate storage in a transmission means, data packets are transmitted under the control of the postage meter machine and an automatic acceptance of the current fee schedule by the postage meter machine is thereby assured.

An alternative transmission means is a chipcard that is inserted into the chipcard write/read unit **20**. The interface board of the chipcard write/read unit **20** is for a serial interface postage meter machine. The contacting means includes at least six contacts at the data exchange between an unprotected chipcard memory region and/or a protected chipcard memory region and a non-volatile memory of the program memory **11** of the postage meter machine is automatically serially undertaken within the framework of a

communication protocol as soon as the chipcard has been plugged into the plug-in slot. Although intended to be utilized for a location input, a personal chipcard of the user can also be utilized for setting an advertising slogan dependent on the cost center, as disclosed in European Application 566 225. The user-relevant settings of the cost center and of the advertising slogan via the keyboard of the postage meter machine that are otherwise respectively required are thus advantageously eliminated. Moreover, a corresponding postage stamp or slogan text part is additionally communicated for the setting in order to be able to modify the print image data that are already present in stored form in accord with the change of location. A chipcard that contains new advertising slogan data to be accessed during printing in its two memory areas is disclosed in European Patent 504 367. Differing therefrom, however, in the invention the advertising slogan is to be only partially reloaded and these parts are to be reloaded only once after a change in location. The modified advertising slogan is mainly based on data that were previously stored. In addition, there is the possibility of subsequently loading data for details that have not yet been stored, whereby these details do not yet yield a message in and of themselves, but only do so in combination with data that are already stored.

The postage meter machine is equipped with a non-volatile memory for a number of advertising slogans respectively allocated to the cost center of the user and is equipped with a chipcard write/read unit and enables a more frequent change of card for a number of users. An advertising slogan detail thus can be subsequently loaded into the postage meter machine, a fixed number of advertising slogans can already be stored in non-volatile form in an internal the memory **10** (which may be an EEPROM) at the manufacturer's factory.

A corresponding executive sequence for data loading or for updating is stored in a further circuit or program means in the program memory **11** and in the non-volatile memory areas of the clock/date module **8** and/or the memories **5***a* and **5***b*. The protected postal region of the processor system of the postage meter machine can, for example, be fashioned as an ASIC, so that the executive sequence cannot be manipulated in an unauthorized way. Before an allocation of semi-variable window data that relate to the location in the postmark, a location-specific initialization of the postage meter machine ensues manually or, preferably, automatically.

The arrangement for entering data into a postage meter machine includes input and output means that are connected to a processor system. It is inventively provided,

a) that the input means comprise first actuation means in order to set the postage meter machine to a different mail carrier;

b) that the input means comprise second actuation means for specific setting of a new mail carrier;

c) that a processor system contains a microprocessor that is programmed with a routine

c1) in order to correspondingly load the data of the set, new mail carrier in automatic routines (900, 1000) of the communication mode (300) and in order to handle a specific control data file in order to generate a change in the print format, and

c2) the microprocessor is programmed with a routine for positioning sub-images with an actuation means, with the change data generated during positioning being nonvolatilely stored in a manner allocated to the respective mail carrier, or allocated to a carrier identification number (CIN) corresponding to the selected mail carrier, and the control data file contains a plurality of sub-image data files.

Before the aforementioned routine for positioning sub-images, sub-image data files of a control data file are initially reloaded via a modem and are positioned in a predetermined stamp region.

This type of reloading is particularly provided for digital printing processes that allow a program-controlled embedding of variable or semi-variable window pixel field data in constant frame pixel field data. A possible method for controlling the column-by-column printing of a postage character image in a postage meter machine is disclosed, for example, in European Application 578 042.

The overall flowchart for the postage meter machine shown in FIG. **2** shows a start and initialization routine **101**, including a sub-step **101.1** in which a communication requirement is formed. This is required in order to initiate an automatic communication with the data central and in order to implement a corresponding data transmission. As a result of the data transmission, a change is entered into the memories of the postage meter machine, so that the place name in the date stamp that is printed out appears changed according to the current location.

The inventive method for entering data into a postage meter machine is based on an automatic modification of the most recent status of stored data contents in the postage meter machine for the setting thereof. The following steps are thereby inventively implemented:

I) Initialization in step **101** of a postage meter machine that is fashioned for postage calculation according to weight data communication from the scale **22**, including a place-specific initialization of the postage meter machine in sub-step **101.1**;

II) Fetching data in a first step **201** for an automatic checking of the change and for checking the most recent status of data contents stored in the postage meter machine in a second step **209** on the basis of current date data and with the stored, previously entered data;

III) Offering location-specific data for the postage meter machine in external memories; and

IV) Updating the internally stored data, with updating data being transmitted to the postage meter machine from an external memory.

The data that relate to a change in location and that are to be previously authorized by the data central can, of course, only reach the receiver when his local telephone number is correct. A specific initialization of the postage meter machine with input of the telephone number of the postal zip code PLZ is required.

In one version, the postage meter machine is programmed in order to communicate the telephone number of its connection to the data central. The telephone number of the calling terminal is transmitted to the data center and is evaluated therein. The data central includes a data bank in which the aforementioned telephone number parts (local network area codes) are stored in a manner allocated to critical franking image parts. The data bank of the data central registers an allocation of machine number, location and loaded carrier constellation for each postage meter machine.

In another version, the determination of location is supported by a commercial telecommunication service. Telephone and mobile radio telephone services allow the data central to undertake an identification of location in a short time during a single call when the postage meter machine

calls the data central, and data from the locally responsible switching center are thereby inserted between the dial signals, these unambiguously identifying the calling terminal. An analog modem utilized in the data central is correspondingly programmed to filter out such local identification data. To that end, it is necessary that the dial signals be communicated to the data central in dual tone multi-frequency signaling (DTMF).

If a digital modem is used, particularly an ISDN modem, the ISDN caller identification service (so called "caller ID") can be advantageously utilized, the postage meter machine being connected thereto. The part of the telephone number that unambiguously identifies the terminal is generated by the telephone switching center to which the terminal is allocated.

Given location input via a chipcard, an authorization must be previously obtained. This is more time-consuming but likewise allows a location for the respective mail processing system to be registered in the data central. The location-specific offering of data optionally ensues with a card-like transmission means or with external memories on the basis of a communication network (modem, mobile radio telephone) in conformity with the existing postage meter machine model.

In another version, input of the location is undertaken, for example, by keyboard instead of by remote data transmission or instead of by chipcard. The postage meter machine, for example, is switched on by a new user after a change in location. Such an input possibility exists after activation in sub-step **101.1** of step **101** of the initialization routine by entering the postal zip code PLZ into the postage meter machine. After entry of the last numeral (PLZ has five digits in Germany) or numerals (the part of the 8-digit zip code to be entered in the USA has three digits), the input is automatically accepted. Independently thereof, an updating after such an initialization can be implemented under the control of the postage meter machine via a communication network or transmission means, whereby a location-specific offering of data for the postage meter machine ensues in an external memory.

During the initialization routine **101**, there is the possibility of changing the prior place name or the prior carrier constellation by entering the location or by defining a new set of mail carriers. The stored set of mail carriers has a priority table allocated to it, with the most beneficial mail carrier receiving the highest priority. An unfavorable mail carrier achieves a low priority. In addition, a location-specific offering of further list is provided on the part of the data central in order to undertake an entry of a CIN (carrier identification number) corresponding to the name of the mail carrier in a sub-step **101.2** of the step **101** for initialization the postage meter machine. A location-specific offering of data that can be loaded from an external memory (for example, in the data central) via a communication network ensues in the list.

After the initialization routine, a branch is made to a first step **201** in order to fetch settings for the postage meter machine that are stored in non-volatile fashion. For example, a personal computer (PC) **21** can be connected, thereby enabling more comfortable user prompting for the postage meter machine. The respective postage meter machine settings are then undertaken PC-controlled. The interfaces in the input/output control means are selected in order to recognize the connected periphery means and in order, if necessary, to switch the postage meter machine into a required pre-programmed operating mode that enables the collaboration and communication with the aforementioned periphery means. The interface to the scale **22** is thereby also selected a mode switching ensues when a scale is connected for entering weight. The postage meter machine is then in the slave condition. After a number of inquiries have been executed in further steps **202, 209, 301, 211, 212** and **214**, the postage fee for a weighed mailing, or corresponding to the setting, is determined in the franking mode **400** (FIG. 2). Further explanations can be derived from European Patent Application No. 96250192.0 having the title "Verfahren zur Absicherung von Daten und Programmcode einer elektronischen Frankiermaschin ".

For preparing for the print-out, an automatic printing data entry with protected data also ensues in the initialization routine **101**, as disclosed in greater detail in the aforementioned European Application 96250192.0. Security criteria are interrogated in the aforementioned step **202** and if the result of this interrogation indicates the criterion are met suggesting a security breach, a warning can be displayed in another step **203**. Even when no further entries are undertaken, a stamp imprint can be generated immediately and printed in a manner secured against manipulation with the stored data. If the interrogation in step **202** indicates the machine is secure, a specific input and display routine is executed in step **209**. In step **209**, the previous data stored in non-volatile fashion can be overwritten or modified with the input means of the postage meter machine or other inputs can be actuated and displayed. Further, an input of printing data with inventively optional positioning of sub-images is provided.

After step **209**, point e, i.e. the beginning of a communication mode **300**, is reached and an inquiry is made in a third step **301** to determine whether a transaction request is present. This is the case when requested data were formed or an input was undertaken for the purpose of recrediting. When this is not the case, the communication mode **300** is exited and the point f, i.e. the actual operating **290** of the postage meter machine, is reached. If relevant data were communicated in the communication mode, then a branch is made to step **213** for data evaluation. In step **213**, a statistics and error evaluation is implemented in order to acquire further current data that can likewise be called in step **201** after branching to the system routine **200**. A branch is made to step **212** if non-communication was found in step **211**.

A check is now made to determine whether corresponding inputs have been actuated in order, given a test request **212** to proceed into the test mode **216**. Otherwise a display mode **215** is reached if a check of the register status is requested in step **214**. When this is not the case, point d, i.e. the franking mode **400**, is automatically reached. A branch is then made from the franking mode **400** to the point e when the number of items credit is used and a communication must be undertaken with the data central in order to be able to continue to frank. A branch is repeatedly made from the franking mode **400** to point f in order to enable a data input with the postage meter machine keyboard in step **209** as long as a signal for print output request has not yet been generated. When, however, a piece of mail was recognized, the print output request generated and a franking implemented, then a branch is made back to point s.

The inventive method thus includes the calling of data in a first step after an initialization and the implementation of a routine in a second step before the implementation of a communication with a remote data central in a third step for offering location-specific data for updating. This procedure is executed with an implementation of specific sub-routines, as follows.

The routine (second step **209**) that includes sub-routines for inputs, for forming request data, for automatic printing

data input and for display includes a first sub-step **209-1** (FIG. **3**) for undertaking selected inputs relating to further mail carriers and to the positioning of associated stamp image parts, whereby the inputs selectively undertaken in the first sub-step **209-1** are determined with appropriate steps and are displayed in the second sub-step **209-2**. In a nineteenth sub-step **209-19** of the aforementioned routine **209**, request data are formed for non-available or modified data sets, associated with the implementation of functions relating to a slogan, selected impression or mail carrier setting of the postage meter machine, including the checking of the data (sub-steps **209-16, 209-17, 209-18**). The respective functions are called by the actuation of the keyboard **2** in the first sub-step **209-1** and are determined in inquiry steps (**209-7, 209-9, 209-11**), or data from the clock/date module **8** are called in the first step **201** but modified due to the passage of time are determined. The modification can be determined by the control unit **6** in a third step-**209-3**.

A sub-routine for positioning sub-images (sub-step **209-22**) is provided in the second step **209** in order to modify the control data file on the basis of the actuation of selected key, the change data generated during positioning being checked in the fifteenth sub-step **209-15** to determine whether they lie in the allowable range. Allowable change data determined in the sub-step **209-21** lead to a modification of a control data file in the sub-step **209-22**, and the change is displayed in the form of a modified clear text presentation of the print image with a second sub-routine **209-2**.

FIG. **3** shows a flowchart of a data entry procedure for the postage meter machine for explaining the invention in greater detail. The second step **209** for an input and display routine has been supplemented by specific inquiry steps. In the second step **209**, the previously non-volatilely stored data are to be overwritten with a pre-dating for future mail with the input means of a postage meter machine and the changed data are to be displayed. To that end, a date displayed in the second sub-step **209-2** is overwritten on the basis of the date input undertaken in the first sub-step **209-1** with the input means before a corresponding third sub-step **209-3** for inquiry is reached. If a date other than that prescribed by the clock/date module **8** was set, this is found in the inquiry step **209-3** and a branch is made to the fourth sub-step **209-4** in order to implement the change to predated or current date. After a branch-back, the new date is displayed in the second sub-step **209-2**. Such a method for date setting for electronically controlled postage meter machines can ensue, for example, as disclosed in detail in German OS 19 520 898. A suitable method with an arrangement for generating a flexible user service for postage meter machines can be realized, or a method as disclosed in German OS 42 17 478 can be used. The postage value in field **4** of FIG. **4***a* of that document can be overwritten in the same way, using so-called softkeys. Alternatively, a keyboard and a LCD display unit can be utilized as actuation and display means, as disclosed in detail in European Application bearing the title "Benutzerschnittstelle fur eine Frankiermaschine" (User Interface For a Franking Machine).

Inventively, a branch is made from the fourth sub-step **209-4** for changing the date via further sub-steps, particularly sub-step **209-19** in order to form requested data and via a sub-step **209-20** in order to reset the loop counter back to the point t at the start of the input and display routine (second step **209**).

If it is found in the inquiry in the third sub-step **209-3** that no different date data were selected, the next inquiry in the fifth sub-step **209-5** is reached. An interrogation is thereby made to determine whether a different value was selected in the input. If this is the case, i.e. when a different value was selected in the input, then a branch is made to the sixth sub-step **209-6** in order to generate an encoded check code (MAC) over the selected value. A preferred method for protecting data in program code is disclosed in European the aforementioned Application 96250192.0. After the aforementioned sub-step **209-6**, a branch is made via the sub-step **209-20** in order to reset the loop counter back to the point t of the start of the input and display routine (second step **209**). If, however, this is not the case, further incrementing steps **209-7-209-14** are executed.

A direct value entry via the keyboard **2** is also possible with the first sub-step **209-1** when no scale is connected, for example for known fee schedules. The basis for the presentation of respective carrier-specific stamp image is a carrier-specific control data file which is suitable for determining or for modifying an allocation sub-images to other variable image data files (window image data) or invariable sub-image image data files (frame image data). Such image data files in sub-image data files in control data files and associated picture element data files are disclosed in detail in published European application 0 762 332 having the title, "Verfahren zum Erzeugen eines Druckbildes, welches in einer Frankiermaschine auf einen Träger gedruckt wird" (Apparatus For Generating a Print Image, To Be Printed on a Carrier in a Franking Machine).

A check is made in the sub-step **209-7** to determine whether a different slogan was selected in the input which occurred in the first sub-step **209- 1**. A check is made in the sub-step **209-9** to determine whether a different carrier was selected in the input which occurred in the first sub-step **209-1**. A check is made in the sub-step **209-11** to determine whether a different selective imprint was selected in the first sub-step **209-1**, this, of course, representing a carrier-specific service. Further services of the mail carrier are directed, for example, to types of mailing such as express mail, air mail, printed matter, return receipt, etc. and are preferably displayed in the display field for the selective impression in the overall stamp image of the postage meter machine.

It is advantageous for an on-going adaptation of the user service to the user to be undertaken, as disclosed in German the aforementioned OS 42 17 478, and for—by branching back to the display to the second sub-routine **209-2**—producing a cleartext presentation on the display **3** of the stamp to be printed. A modification of the stamp image that has been undertaken can thus be easily monitored, particularly when change inputs relating to a different slogan, a different carrier or to a different selective impression were undertaken.

When—assuming a corresponding input in the first sub-step **209-1**—one of the sub-steps for checking for slogan input (**209-7**), for checking for carrier input (**209-9**) and for checking for selective impression input (**209-11**) is reached, a branch is made to a respective one of steps **209-8,209-10** and **209-12** for checking the availability of the data in the postage meter machine. As in all inquiries in steps **209-3** to **209-13**, if the inquiry is answered in the negative, the routine proceeds to the next inquiry in the sequence. A negative answer in step **209-14** causes a branch to point e (FIG. **2**).

Given available data, a branch is made from the respective sub-step **209-8, 209-10** and **209-12** to the slogan, carrier or selected impression input check back to respective security check steps **209-16, 209-17** and **209-18**, whereby an automatic print data input is undertaken given validity. A data check on the basis of an encoded check sum (MAC) prevents

a manipulation with fraudulent intent, as disclosed in detail in the aforementioned European Application No. 96250192.0.

If, however, the data are not available in the postage meter machine, a branch is made at a point k to a sub-step **209-19** in order to form request data. If actuation means (keys) for a new entry of a carrier were actuated during the input routine (first sub-step **209-1**), this is determined in an inquiry step (sub-step **209-13**) and a branch is likewise made to point k of sub-step **209-19** in order to form a requested data set. The aforementioned sub-step **209-19** is explained in greater detail below in conjunction with FIG. **8**. The aforementioned inquiry step (sub-step **209-13**) in conjunction with the new entry of a carrier in the first sub-step **209-1** is explained in greater detail below with reference to FIGS. **4A–4M**. This inquiry step **209-13** may have been preceded by an input routine and by a further inquiry step in order to proceed to enter new carrier information, which is likewise explained in greater detail below with reference to FIGS. **4A–4M**. When the offering of stored carriers is not adequate for the user, the user calls information about further carriers (carrier info). A further service of the data central explained below in order to handle customer wishes can used as needed and for entering a further mail carrier. An entry of the respectively beneficial mail carrier can be achieved by an automatic dialing of the data central without having to undertake a calculation in the postage meter machine. The data of the heretofore beneficial mail carrier are erased and the ranking of the priorities is correspondingly modified.

An inquiry criterion about a sub-image positioning is inventively satisfied in the sub-step **209-14** in FIG. **3** when a corresponding actuation of the keyboard **2** or other input means has ensued within the framework of the input routine (first sub-step **209-1**) in order to differently position a sub-image in the stamp image. A positive result of the inquiry in the sub-step **209-14** causes execution of routine for forming change data for positioning a selected sub-image (sub-step **209-15**) in order to branch to a sub-step **209-21** for inquiry as to whether the change data still lie in the allowable range defined by the carrier. If this is not the case, a branch is made via the sub-step **209-20** for resetting the loop counter back to the point t. If, the change data still lie in the allowable range to find by the carrier, a branch is made to a sub-step **209-22** in order to correspondingly modify the control data file which includes a number sub-image data files that respectively define sub-images of the print image. From the sub-step **209-22** for modifying the control data file, a branch for resetting the loop counter is then again made back to the sub-step **209-20** and, subsequently, to the point t.

Otherwise, when the inquiry criterion about a sub-image positioning is not satisfied in the sub-step **209-14**, a branch is made to point e as noted above.

A number of further inquiry steps that are executed before the point e is reached are arranged between the inquiry steps **209-11** and **209-14**. Some of these inquiry steps—not shown in FIG. **3** for reasons of space - relate to the selection from a number of carriers, this being explained in greater detail below with reference to FIGS. **4A–4M**.

When an inquiry criterion is met, a branch is made via a further processing steps and via the aforementioned sub-step **209-20** back to point t at the start of the second step **209**. A display with an input possibility in the first sub-step **209-1** subsequently ensues in the second sub-step **209-2**, whereby a multi level interface user can be advantageously utilized in order to enable a number of different inputs. Such a suitable user interface is explained in greater detail below in conjunction with FIGS. **4A–4M**.

FIG. **4M** shows a display structure for the postage meter machine as disclosed in the aforementioned German OS 42 17 478. Proceeding from a presentation in a first level, a switch can be made down to a hierarchally lower-ranking second level by actuating an actuation means in the input means (such as a key of the keyboard **2**). The display unit **3** of the postage meter machine includes a number of fields to which operating elements are allocated, whereby the function of these operating elements being dependent on the presentation in the respective field. A presentation (face) preferably has four fields, as shown in FIG. **4I**.

The displays that are reproduced by the display unit **3** when the individual levels and further sub-levels are reached are shown in FIGS. **4A–4H** and **4J–4L**. A sub-level with a presentation of further selection possibilities can be fundamentally reached proceeding from every field. For example, a switch can be made to a sub-level shown in FIG. **4E**, as disclosed in the aforementioned German OS 42 17 478. Inventively, a third display field is provided that includes a listing of functions related to a number of carriers.

In the first level, FIG. **4A** shows a cleartext presentation of the overall stamp image to be printed, as was fundamentally disclosed in the aforememtioned German OS 42 17 478. An arbitrary number of fields of the stamp image to be printed can be displayed as needed in cleartext presentation. Required settings in order, for example, to modify the stamp image to a further presentation shown in FIG. **4B** can be undertaken with the allocation of operating elements (soft keys).

According to FIG. **4B**, arranged in a tree-like display structure as shown, for example, in FIG. **4*i***, a third display field exists in face 2.0 of the second level of the display structure, as was disclosed in the aformentioned German OS 42 17 478. Inventively, one of the following functions can now be selected in an expanded listing:

Postage computer on/off

Automatic carrier setting according to the most frequent carrier;

Automatic carrier setting according to carrier having the highest priority;

Selection of a different (new) carrier.

The input means of the postage meter machine has an actuation means at least for an automatic carrier setting.

Proceeding from the aforementioned function of a selection of the different (new) carrier given a corresponding actuation of an actuation means, a presentation with inventively further functions shown in FIG. **4E** in the fourth display field is reached relating to a selection possibility for carrier **1**, carrier **2**, carrier **3** and for information about further carriers as well as a possibility for a new entry of a further carrier. The aforementioned functions can be scrolled in order, given acknowledgment of a selected function, to display the available services, as disclosed in German OS 42 17 478 in FIG. **4F** for a specific, first carrier.

Another suitable user interface is disclosed in the aforementioned published European Application 0 718 801.

A specific service of the data central, for example is to combine customer wishes in criteria as assistance for the carrier input. Customer wishes can be combined in criteria on the basis of the empirical values about use requirements that are communicated to a data central (DC) and stored. After communication of a carrier inflow to the user, the user of the postage meter machine can select a carrier by accessing stored carrier data or via the actuation means, the user initiates an updating of its data in view of the carrier most beneficial for that user. Advantageously, the selection requires no specific calculations for a number of carriers in

the postage meter machine when the data central provides the service of finding the most beneficial carrier. The carrier info includes specific information about at least one of the carriers who offers the most beneficial services for the customer. The specific data of the most beneficial carrier is supplemented by the data central for payment given a request by the customer. Another carrier info is a notification that special carrier offerings are available. A predetermined actuation of at least one of the keys of the input means of the postage meter machine initiates the payment and corresponding updating data are then communicated. In detail, the following method steps are executed:

a) The customer stores (notes) the criteria of interest to him and enters into an agreement with the operator of the data central (service provider) regarding information communication within the framework of transactions with the data central. The customer wishes are combined in the data central to form criteria which are customer-specific and are stored in a data bank.

b) Communication of the telephone number of the carrier and its carrier info to the data central DC with respect to advertising of special carrier offerings.

c) The customer wishes combined in the aforementioned criteria are stored in a customer-specific manner in a data bank in the data central. An incoming carrier information is investigated for relevancy to every customer wish.

d) Communicate information to the customers that new things are available.

e) Storing the carrier information by selection, or as needed.

f) Forming a customer-specific sequence (hierarchy) in the postage meter machine for carriers in order of preference dependent on the frequency of beneficial special offerings.

g) Processing in the postage meter machine corresponding to the aforementioned sequence.

Thus carrier information be communicated to the user almost as soon as they become available. This causes changes that have occurred for the carrier in the interim (new rules, different fee schedules, different logos) to be noted given a constantly activated postage meter machine or given postage meter machines that are seldom employed for frankings. The user must be informed in writing or via electronic media. The latter assumes the presence of appropriate terminal equipment (network PCS or remote reception equipment suitable for multimedia.

Specific other terminal equipment or postage meter machines wherein a message (for example, an electronic advertisement) communicated from the data central is possible upon activation or during recrediting. A corresponding signaling for example, by the display **3**, is required regarding new things (date and abbreviation or message) and a memory for carrier information and the associated carrier identification number (CIN). As needed, the customer sets the postage meter machine for requesting a communication of data of interest (on-demand principle). After selection in the second sub-step **209-2** or actuation of a corresponding key in the first sub-step **209-1**, an inquiry is made in the sub-step **209-13** to determine whether an input for storing the carrier information was undertaken. If this is the case, a branch is made to the sub-step **209-19** in order to communicate appropriate request data to the data central. The CIN of the carrier information, which was non-volatilely stored in the postage meter machine, is automatically entered for carrier selection.

Every mail carrier has a carrier identification number CIN, a customer-related priority, fee schedule for services, including postage fee table, with (possibly) the minimum validity duration of the postage fee table belonging to the CIN allocated to it. The priority can be defined as maximum for the particular carrier which was most recently set or for the carrier most frequently set. When a different mail carrier is selected, then corresponding request data are to be formed, as shown in FIG. **8**, in order to request the aforementioned carrier-specific data from the data central. The request data are non-volatilely stored and are thus available after a voltage outage. After the voltage outage, the carrier that was most recently selected or is most frequently selected is automatically set.

Similar to the procedure disclosed in German OS 42 17 478, a switch can be made to the third level of FIG. **4M** which is shown in FIG. **4C**. This includes a first display field for a function directed to stamp offset. In this function, it is possible to achieve an overall stamp offset of, for example, 20 mm with reference to the edge of the letter. In accordance with the invention, this includes a listing of the functions related to a positioning of the stamp images and sub-images. It is inventively possible in one of the additional functions to modify the positioning of sub-images. To that end, a switch is made to an inventive sub-level shown in FIG. **4K**.

The inventive sub-level shown in FIG. **4K** includes at least one first display field for a positioning or selection within the mail carrier service, a second display field for a positioning or a selection of an advertising slogan, a third display field for a positioning or selection of sub-images of a postmark and a fourth display field for a positioning for a selection of a carrier logo. There is also an inventive possibility of switching into a sub-level shown in FIG. **4L** in order to undertake a fine positioning or modification of the correspondingly selected sub-image. With respect to the stamp image, at least an allocated name of the stamp image is displayed in the respective display field. After switching into the first level of the display structure, the now-modified overall pixel image can again be displayed as a cleartext presentation (FIG. **4A**).

According to the illustration in face **2.0** of the second level of the display structure of FIG. **4B**, there is a fourth display field from which a switch can be made for a first carrier to a display of register values—as shown in FIG. **4D** which is FIG. **4***d* of German OS 42 17 478. This, for example, enables the remaining credit on hand that are still available for franking to be displayed. The display according to the inventively developed FIG. **4D** now allows a carrier-specific presentation of register values for a number of mail carriers that allows the use of the postage meter machine for different carriers and jobs to be tracked.

The fields shown in FIGS. **4G**, **4H** and **4J** are described in more detail in German OS 42 17 478, and are not of particular significance to the invention herein. In general, the fields shown in those figures are for activating, setting or aborting a particular procedure (FIG. **4G**), for altering the name of the cost center at which the postage meter machine is located (FIG. **4H**) and for servicing (FIG. **4J**).

FIG. **5** shows a routine for handling communicated data. This routine shows the combining of communicated sub-image data into image data, the sub-image data files and image data files already being stored in a control data file of the postage meter machine. It is assumed that fundamentally existing picture element data files of the postage meter machine can also be accessed for generating the sub-pixel image given a change in the place name. The aforementioned routine enables a location-specific offering of window

data, for example for the postmark, for the purpose of being printed on a piece of mail by the postage meter machine. The control data file of the postage meter machine is thereby correspondingly supplemented, this continues the instruction as to how and which picture element data files are to be involved for generating which sub-images for producing an overall pixel image.

A routine **900** includes a sub-step **909** for sending request data to the data central. The request data are already formed in step **209-19** (FIG. **8**) when an updating requirement is present. After the sub-step **336**, the point q for a sub-step **338** (FIG. **9**) is reached when one of the transactions has not yet ended. The routine **900** for incorporating communicated sub-image data into image data according to FIG. **5**, following the sub-step **909** for sending the request data to the data central, executes the sub-step **910** in order to select a non-volatile memory area in the postage meter machine in which the requested data later can be intermediately stored. On the basis of its data bank, the selected data central checks in the meantime to determine which data corresponding to the request are still missing in the postage meter machine and must be communicated. In the postage meter machine, a branch is made from the aforementioned sub-step **910** via a sub-step **911** for receiving and decoding the data packet communicated from the data central to a sub-step **912** in which a first processing of the data ensues. Particularly given high transmission rates as allowed, for example, by ISDN modems, an intermediate storage and, if necessary, a subsequent decompression ensue first. A split (divided) storage of data parts can now ensue, these data parts relating to: processing status, data set (header, version information), change data for a control data file and for information as well as sub-image data files and, possibly, picture element data files that are required for generating a modified sub-pixel image. The transmission and storage of the picture element data files automatically ensues at the same time and is required, for example, when the character train of the place name is to be printed out in some other form (similar to special postmarks for first-day-of-issue letters) which is lacking in the corresponding picture element data files in the postage meter machine. After this, a sub-step **913** for starting is reached or in order to set an identifier for the processing status. The latter is required in order, given a program abort, for example, as a consequence of an interruption in operating voltage, to non-volatilely conserve the program status that has been achieved in order to continue the program at this point after return of the voltage. In the following sub-step **914**, the data about a change in the control data filed are interpreted in order to subsequently implement the required changes in sub-step **915** and to insert the allocated the sub-image data. The change data of the control data file relate to the image data and are entered into the corresponding data files and stored in non-volatile fashion. A check is made in the following inquiry step **916** to determine whether the implementation of the change has ended or whether further changes of the control data file must still be undertaken. When a change has ended, a branch is made to sub-step **917** in order to enter the data set. Otherwise, a branch is made back to sub-step **914** in order to undertake further changes.

If the data set was entered in sub-step **917**, a check of the sub-image data for integrity can ensue in sub-step **918**. A decision is then made in the inquiry step **919**, given the presence of acceptable data, as to whether a branch should be made to sub-step **920** or whether, given an absence of acceptable data, a branch should be made to sub-step **921**. The processing is canceled in sub-step **921** and a branch is made to point w after an error message in sub-step **922**. Given a proper execution and integrity of the data, an updating of the data stored in non-volatile fashion is undertaken in sub-step **920** and the next action or transactions is then called and a branch is made to point r, whereby a branch is made to the point q of the corresponding routines via the inquiry steps **335** and **336** according to FIG. **9**. Otherwise when no next action or transaction is required, a branch is made to point r and the status display in sub-step **310** according to FIG. **9** is reached via the inquiry steps **335** and **336**.

The aforementioned routine **900** shown in FIG. **5** is just as well-suited for modifying a different stamp image according to the rules that a mail carrier has defined. A change ensues automatically when a different carrier was selected whose data must be updated in the postage meter machine. This case, according to FIG. **3**, is recognized by inquiries **209-9** and **209-10** in order to then form request data, as is explained in greater detail with reference to FIG. **8**. Subsequently, the communication mode **300** is reached, this being explained in greater detail with reference to FIG. **9**. It is also assumed that every mail carrier has its own fee structure and charge classification that may possibly likewise require updating. The specific inquiry **209-10**—shown in FIG. **3**—again serves this purpose in order to form request data, as shall still be explained with reference to FIG. **8**.

The routine **1000** for handling communicated table data in the postage meter machine shown in FIG. **6** includes a sub-step **1009** for sending request data to the data central. A sub-step **1010** is then executed in order to select a non-volatile memory area in the postage meter machine in which the requested data can be intermediately stored later. After the sub-step **1010**, a branch is made via the sub-step **1011** for receiving and decoding the data packet communicated from the data central to a sub-step **1012** in which a start processing status is set for a data processing. The first processing of the data then ensues in sub-step **1013**. The intermediate storage of the data is advantageous when data are communicated in a number of transactions or when a transaction must be repeated. After leaving the communication mode **300** a determination is made in inquiry step **211**—shown in FIG. **2**—that data were communicated and a branch is then made to the statistics and error evaluation mode **213**. Given freedom from error and validity of the communicated data, a non-volatile storage in the postage meter machine ensues in the aforementioned evaluation mode. After intermediate storage and, if necessary, after a following decompression given packed data in sub-step **1013** and after the execution of further sub-steps **1014**, **1015** and **1020**, a storage of the data set that belongs to a complete postage fee set of a mail carrier ensues. Such a data set has a header, version information, sub-table data and a data set end identifier (DEK).

In sub-step **1014** for checking for complete reception of the communicated data packet, a branch is made to a sub-step **1015** given completeness in order to set an end identifier as the processing status. Such identifiers are required in order, given a program report, for example as a consequence of an interruption in operating voltage, to be able to continue the program at this point after the voltage returns. In the following sub-step **1020**, the next transaction or action is called and a branch for further execution of the sequence shown in FIG. **9** is made in order to store the intermediately stored updating data in non-volatile fashion in a step **213** that follows later.

Given an improper course that was found in sub-step **1014**, the point q is reached. By branching to sub-step **334**

according to FIG. **9**, a further attempt can be started in order to transmit the required sub-table data. The sub-steps **335–336** are thereby executed and the point q according to FIG. **5** is then reached.

The routine **209-19** for checking stored data and for forming request data is explained in greater detail on the basis of FIG. **8**. A comparison of predetermined data areas for checking data on the basis of corresponding, predetermined comparison data stored in non-volatile fashion ensues in sub-step **2091-19** in order to be able to identify changes that have occurred or that have been entered. Specific inquiries ensue in the following sub-steps **2092-19, 2093-19** and **2094-19** in order to form specific request data in the respective, associated sub-steps **2095-13–2097-13**. When the location was changed, whereby the country, the region and/or the place was newly entered, a branch is made from sub-step **2092-13–2095-13** in order to form and store request data together with the current date and carrier. Transgression of the validity date is checked in sub-step **2093-19**, this being allocated to each carrier-specific table in order to form and store request data together with the current location and carrier. A newly entered a field name is evaluated in sub-step **2094-19**, with tables and information being specifically identified therewith before a branch is made to sub-step **2097-19** in order to specifically form and store requested data. A branch directed to point I is made only when no changes were detected in the inquiries **2092-19–2094-19**.

FIG. **9** shows the communication mode for the postage meter machine that is required in order to implement a data transmission that sequences largely automatically by modem. A recognized transaction request in sub-step **301** of step **300** leads to the display of the data and of the status in the sub-step **332** in order subsequently to branch to a sub-step **334** for producing the call setup to the data central DC after an initialization of the modem and selection of the data central DC (telephone number) in sub-step **333**. If an initialization of the modem and selection in sub-step **333** cannot be successfully implemented, a branch is made via a sub-step **310** for display of the status back to sub-step **301**. An inquiry is made in a sub-step **335** following the sub-step **334** to determine whether the call setup was successful and if the call setup has not properly ensued the sequence of sub-steps **334, 335** and **337** loops until a determination is made in sub-step **337** that the connection cannot be produced even after an n^{th} redialing, in which case a branch back to sub-step **301** is made, via sub-step **310**.

If there is no still-pending transaction request, the inquiry in sub-step **301** causes a branch to sub-step **211** (FIG. **2**, but also shown in FIG. **9**).

When, however, the call inquiry in sub-step **335** shows the call setup has ensued properly and it is found in sub-step **336** that one of the transactions has not yet been ended, an automatic reloading with data begins in sub-step **338**. Corresponding to the change of the CIN that is stored in the postage meter machine, a reloading now ensues. If the CIN was not modified but the minimum validity duration for the fee schedules stored in the postage meter machine has been exceeded or a different set of mail carriers was defined, the data central is likewise automatically selected and an updating is accomplished.

A determination is made in sub-step **338** as to whether an error status has occurred that can be eliminated by a renewed call setup to the data central in order to branch back to sub-step **334** via q. It is also determined in sub-step **338** whether an error status has occurred that could not be eliminated in order to branch back to sub-step **310** via w for the purpose of data display. When a transaction has been carried out, further transactions can be implemented, with a branch being made back to sub-step **335** via r. When the connection is still intact, a check is carried out in sub-step **336** to determined whether all transactions have been implemented whether or the last transaction has ended in order then to branch back to sub-step **301** via the sub-step **310**. The flag for a transaction request is reset in sub-step **338** with the end of the last transaction. A branch is thus made from sub-step **301** to step **211** in order to now store and evaluate the selected data communicated to the postage meter machine. The priority of the transmitted CIN can be automatically classified in a predetermined way (according to frequency or priority) in the evaluation. The type of classification can be set. At least one actuation means key is provided in order to set the type of classification.

The automatic reloading with data in sub-step **338** includes specific handling routines that were set forth in greater detail in conjunction with FIG. **5**. The method supplies a location-specific offering of window data for the postmark or of auxiliary functions for the postage meter machine as well as supplying current information for a permanent and/or temporary configuration of the postage meter machine by a communication network that contains a memory with the fetchable data blocks for reloading auxiliary functions and information into the postage meter machine as well as updating data.

As noted earlier, a processor system is provided for access to entering data into a mail processing system containing the postage meter machine. The processor system is equipped with a program stored in its program memory **11** in order to load at least one fee schedule table from a transmission means into a predetermined write/read memory of the postage meter machine via reception means. It is inventively provided:

a) that the updating data or information for the postage meter machines are stored fetchably as data blocks in the transmission means or in a memory arranged externally from the postage meter machine linked to predetermined request data;

b) that the memory **11** of the postage meter machine forms a permanent memory for programs, whereby one of the programs enables a communication from an external memory via modem **23** and/or from further input units **20, 21, 22** via corresponding interfaces in the input/output control unit **4**;

c) that a write/read memory **5***a* and **5***b* and a clock/date module **8** are connected to the control unit **6**, which is programmed by control data in stored form in the memories **5***a* and **5***b* and/or, obtained from the clock/date module:

c1) to automatically check the most recent status of stored memory contents on the basis of previously stored information and its validity date compared to the current data modified by the passage of time for forming request data,

c2) to determine the conversion or postage fee table currently in force on the basis of the request data previously entered via transmission means and/or input means 2 such as the keyboard and intermediately stored in memories **5***a* and/or **5***b* or obtained from the clock/date module **8**.

c3) to transmit the request data to the data central and communicate data sets corresponding to the input dispatching country or location and the date that are stored in the transmission means or in external memories to the postage meter machine.

It is also provided that the processing in the control unit **6** of the postage meter machine is programmed by control data for determining a reloading requirement that are presently stored in memories **5***a* and/or **5***b* or obtained from the clock/date module **8** to form request data on the basis of the data including the dispatching country or location offered in the write/read memories **5***a* and **5***b* and on the basis of the date defined by the clock/date module **8** of the postage meter machine.

It is also provided that the aforementioned means of the postage meter machine store control data for the transmission of data in the memories **5***a* and/or **5***b* of the postage meter machine, and that the control unit **6** is programmed to switch into standby mode when no postal matter is to be franked with a postage value. The usage pause or input pause is determined in the franking mode and a standby flag is set and a branch is then made to point t.

When executing the inquiry steps, the step **211** is also reached in which the standby flag is recognized in order to branch via the evaluation mode (step **213**) to the display mode (step **215**). In the display mode (step **215**), for example, a time of day can be displayed or some other arbitrary display can be displayed with which little current is used.

After the start (step **100**), an initialization of the postage meter machine ensues in step **101**; it is thereby determined whether the scale key is pressed and a switch has thus been made to the corresponding mail processing system mode. The postage meter machine now operates as slave and the scale as master. In step **201**, the serial interface to the scale is selected and the postage meter machine subsequently waits for a data transmission from the scale. When the data transmission has ensued, a corresponding handshake signal is communicated to the scale. The scale input data transmitted to the postage meter machine in step **201** are called. After communication of the weight value from the scale **22** to the postage meter machine, an updatable allocation table realized in the memories **5***a* or **5***b* is called in order to determine the minimum validity duration or, respectively, the validity time span of the fee schedule table or the service of the most recently set carrier that are evaluated by comparison to the currently set date or to the date presently stored in non-volatile fashion in the clock/date module **8**.

Operation in a mode without scale is also possible. Also provided in this operating mode, the aforementioned monitoring is implemented in step **201** on the basis of the most recently entered data that are stored in order to form request data. For example, date data modified by the passage of time in the clock/date module **8** are automatically called, this change being determined in a following inquiry step **209-3**. In another operating mode, the input is obtained from the keyboard of a PC **21**, with the aforementioned data call in step **201** and the monitoring and (possibly) the formation of request data are likewise implemented in the input and display routine (in step **209**).

The data central is automatically dialed if the minimum validity duration for the fee schedules stored in the postage meter machine is exceeded or if a new mail carrier was set. When a new mail carrier, or other characteristic data, are to be loaded into the postage meter machine, the routines explained with reference to FIGS. **5** and **6** are again applied.

A number of pixel image data files is stored in non-volatile form in the character memory **9** of the postage meter machine and can be supplemented, and thus updated, within the framework of a data transmission of a data packet that is shown in FIG. **6**. For this purpose a first updatable memory area is present in the memories **5***a* and/or **5***b* in which the updated data are written. The control data file having a number of sub-images must likewise be modified for this purpose, for which purpose that second updatable memory areas in the memories **5***a* and/or **5***b* are used. The sub-image data files can be updated or supplemented within the framework of a data transmission of a sub-image data file shown in FIG. **5**. For example, the imprint of a running print count in the stamp image can be required by a mail carrier.

To that end, pixel image data files and sub-image data files must be requested from the data central, as for example, as a result of a selection of a new carrier. Each pixel image data file is provided with an identification code that allows a defined access to a specific pixel image data file during the course of the compilation of the print image, as was described in greater detail in the aforementioned European Application No. 95 114 057.3.

The positioning of image parts in a postage meter machine is explained with reference to FIG. **7**. For example, the insertion of a running print count in the stamp image can be undertaken by reloading, which would lead to a longer stamp image than can fit on a tape strip or the piece of mail. A superimposition of the existing sub-images **1–3** with the communicated, fourth sub-image is therefore undertaken first such that parts of the communicated sub-image are inverted in those picture elements that produce the visual presentation of the picture element (color, gray scale value or blank) (i.e. "Inverted" compared to the mode of presentation of the picture element of an existing sub-image), so that the information remains highly visible. An inverted blank then yields a black or gray or chromatic picture element. Sub-images can be shifted to a different location in the stamp image by positioning. Each image, particularly a stamp image, is composed of sub-images that can be arbitrarily interleaved. Each sub-image has a defined starting position within a stamp image. The stamp sub-images reserve a space for a type of slogan or variable (for example, franking value, date, numerator, text part, carrier logo). Any slogan or any variable can be fundamentally positioned at any location in the stamp image with the assistance of the sub-images.

The data compilation can sequence automatically or in conjunction with an automatic or manual data entry, for example, given the selection of the advertising slogan data. The inventive elimination of the manual data input is anchored in the control data file. When, given an automatic data input off the sub-image data transmitted from a data central, the control data file is modified or augmented, this occurs within the framework of area boundaries defined by the carrier. Otherwise, the carrier-specific control data file must be completely erased or overwritten for reasons of memory space. To this end, the information for control data file modification that are a component of the communicated data set are interpreted.

An arbitrary number of stamp image data, stamp sub-image data, slogan type data, character set data, encoded data (compressed data for images, slogans), picture element data files or bit maps can be deposited in any of the aforementioned memory means. A limitation is present only due to the memory size or due to the address area. The data are preferably stored mixed, or are deposited in special memory areas. Pixel image data files and sub-image data files are deposited in the character memory **9**, at least for the mail carrier whose services are most often used. As needed, pixel image data files that are stored in memories **5***a* and/or **5***b* can be accessed.

Respective data sets exist for such data in order to identify the data and in order to use a pointer to reference a further

data set. The relationship of data sets belonging to one another is produced by the pointers. Print image data can thus be compiled in a universal way on the basis of chained data sets. The invention is suitable for printing graphic characters and images, for example, for a stamp image or for a bar code imprint or for a cost center calculating list including symbols or for letterheads with logo, etc., particularly for future carriers as well. In addition, the pixel memory **7c** intermediately stores the completely compiled image which is displayed on the display unit **3** for cleartext presentation given setting of a first presentation level.

Each data set has a constant length and at least one successor pointer. This points to the next data set and thus chains data sets of equal length in an arbitrary plurality. The linking of the data sets for stamp sub-images to form the stamp image on the basis of the pointers represents a description of arrangement, graphics and position of window data as described in greater detail in the European Application No. 95 114 057.3.

In addition to the start data, at least a first pointer for stamp image data sets and a second pointer for pixel image data sets (slogan data for all areas in the stamp image) exist in a base data file, for example, in a reserved memory area accessible by the control unit **6**. Such storage can be according to the following format.

1. Data set (header) per stamp image: at least two pointers and an identifier are required. A first pointer indicates the data set for the next stamp image. A second pointer indicates the data set for a first stamp sub-image (of m sub-images, m=1, 2, . . .) of the stamp image. A respective number of sub-images that must all be processed per stamp image are allocated to l stamp images (l=1, 2, . . .). Corresponding to the program execution, the search for the corresponding data set that was set for the selected stamp image ensues in a stamp image list. For example, the postage stamp may be a first stamp image to which at least three sub-image data sets are allocated. The sub-image data set identified by the second pointer is now to be sought. The microprocessor (control unit **6**) must compile all m sub-image data sets for the selected stamp image, for example, for the stamp image in the main memory. For time-optimization, the most frequent stamp image data sets (for example, l(1, m)=1 for a first stamp image) and sub-image data sets (for example, m=1 for a first sub-image data set) may be found at the start of the respective list.

2. Data set for stamp sub-images: each data set (1, m) comprises at least one identifier I for slogan type or character set identification, for example "date stamp", "data field" or "advertising slogan" etc. and x/y coordinates of the sub-image in the overall image and other descriptive data (for example, a specific, horizontal minimum printing width), as well as pointers designated with a running index n (for n=1, 2, 3, . . .) for a next stamp sub-image (1, m), for example, (1, 2) for a second sub-image in the first stamp image 1. A first sub-image of the first stamp image relates to the design of the postage stamp (for example, as circle or ellipse); a second sub-image relates to the data field and a third sub-image relates to the place name.

3. Character and slogan data type: after the x/y coordinates and other parameters of all sub-images have been identified, the root data file is sought. The second pointer indicates the pixel data image file, for example, the pixel image data file belonging to the first sub-image, i.e. indicates slogan type data for the stamp image. A window, for example, for a date and for the place name, is reserved in the postage stamp circle. A slogan type data set for the pixel image "date stamp" is taken from a first memory sub-area in order to find the appertaining, compressed slogan image data deposited in the predetermined memory area.

The pointer in the data set (sub-image data file) of the first sub-image now points to the second sub-image (sub-image data file) with the identifier "data field". A second memory sub-area and the predetermined memory area are then sought. For this purpose, the microprocessor has already offered the current date data so that the pixel image of a numeral or the pixel image corresponding to the point in the date character set can now be sought for the character memory **9** with character set stored compressed with the appertaining slogan type or character set type information taken from the second memory sub-area. From the second sub-image data file, the pointer points to a third sub-image data file, for example, for the place name, etc.

The stamp sub-image data set compilation for the postage stamp is now followed by an advertising slogan sub-image data set compilation for the advertising slogan. This processing is continued for the stamp sub-image of the mail carrier logo, for the value (fee) stamp (if necessary) and for the type of service or type of mailing up to the last sub-image not shown in FIG. **7**. At least the last sub-image data file of a control data file for a carrier-specific stamp image is stored in non-volatile fashion in the write/read memory and can be overwritten. As a result, there is the possibility of supplementing the control data file by further sub-image data files.

The data set compilation can sequence automatically or in combination with manual data entry, for example, when positioning the sub-images. By means of a communication with the data central, the suitable pixel image data files adapted to current requirements and sub-image data files for new control data files or control data files to be modified are communicated. At least one parameter of a sub-image data file can be modified within limited regions of the stamp image.

In a further version, the data set compilation for the sub-images of the advertising slogan, of the type of mailing, of the postmark and of the value stamp (for all sub-images or only for some sub-images of a stamp image) can ensue simultaneously. When all print image data have thus been determined, the microprocessor returns to the base data file with its data processing.

An additional, third pointer for the stamp images can be provided in the data set. It points to the STRING (text) stored in the memory area that indicates or describes this stamp image (for example, for a presentation in the LCD display within the framework of a user surface). Such a text pointer is also provided for all other data sets for similar purposes.

The invention is not limited to the present embodiment since other arrangements or, respectively, implementations of the method can also be developed or utilized that, proceeding from the same fundamental idea of the invention, are covered by the attached claims.

We claim as my invention:

1. A method for entering data into a postage meter machine comprising the steps of:

(a) initializing a postage meter machine;

(b) calling non-volatilely stored setting data, for formulating a print data input, into said postage meter machine;

(c) conducting a routine including sub-routines for data entry, for forming request data, for automatic print data entry, for checking and for display of an image to be printed;

(d) entering into a communication between said postage meter machine and a remote data central and transmit-

ting a plurality of sub-image data files and, if necessary, further data files to the postage meter machine from the data central on the basis of said request data communicated from the postage meter machine to the data central; and

(e) updating a franking image to be printed employing said sub-image data files and, if necessary, said further data files, including selectively positioning at least one of said sub-images in an overall franking image to be printed and modifying a control data file containing data corresponding to said franking image to be printed to incorporate any selected change in position of said at least sub-image.

2. A method as claimed in claim **1** wherein step (c) comprises the steps of:

entering mail carrier data restively identifying a plurality of mail carriers and an associated positioning of a respective sub-image relating to each mail carrier;

checking the requested data upon receipt thereof by said postage meter machine from said data central;

updating a sub-image relating to at least one of a time and date from running time-data generated by a clock-date module;

positioning said sub-images in order to modify said control data file by actuating selected actuation elements of said postage meter machine;

checking each change of a sub-image to determine whether the change is within a permissible range and whether permissible have been modified; and

upon approval of the change, displaying the modified franking image in the form of a cleartext presentation on a display of said postage meter machine.

3. A method as claimed in claim **2** comprising the additional steps of:

storing any sub-images transmitted to said postage meter machine from said data central in respective sub-image data files in said postage meter machine in a non-volatile manner;

for any of said sub-image data files which relate to identification of a mail carrier, allocating a carrier identified number respectively to the sub-image data file corresponding to the mail carrier identified therein; and

storing pixel image data in respective pixel image data files non-volatilely for printing the information contained in the respective sub-image data files.

4. A postage meter machine comprising:

a memory;

input means including a plurality of actuation elements for setting said postage meter machine for operation using a selected mail carrier among a plurality of mail carriers;

said input means including an actuation element for specifically setting a new mail carrier, different from a current mail carrier;

processor means responsive to actuation of said actuation element for loading data into a control data file in said memory relating to said new mail carrier for causing modification of mail carrier information a printed franking image which contains said mail carrier information, said control data file containing a plurality of data files respectively containing sub-images uniquely allocated to different one of said plurality of mail carriers and each of said data files containing change data associated with the mail carrier respectively allocated thereto for modifying said franking image dependent on the mail carrier allocated to the sub-image data file; and

said processor means comprising means for using said change data for automatically positioning the sub-image, with franking image, contained in the sub-image data file allocated to the new mail carrier.

5. A postage meter machine as claimed in claim **4** further comprising:

means for establishing communication between said postage meter machine and a remote data central;

means, responsive to actuation of said actuation element for setting a new mail carrier, for establishing communication, via said communication means, with said remote data center to obtain said sub-image data relating to the new mail carrier if said sub-image data relating to the new mail carrier are not already stored in one of said sub-image data files in said memory of said postage meter machine;

means for storing sub-image data communicated to said postage meter machine from said remote data central relating to said new mail carrier in a new sub-image data file in said memory allocated to a carrier identification number for the new mail carrier;

a character memory containing a plurality of invariable sub-data files, and means for storing invariable sub-image data allocated to said carrier identification number of said new mail carrier transmitted to said postage meter machine from said remote data central.

6. A postage meter machine as claimed in claim **4** wherein said input means comprises an actuation element for entering a command for calling an advertisement communicated to said postage meter machine from said data central during a preceding communication.

7. A method for entering data into a postage meter machine at a user location for automatically modifying a most recent status of stored data in said postage meter machine, said stored data corresponding to a setting of said postage meter machine, comprising the steps of:

upon a use of said postage meter machine at any arbitrary time at said user location, initializing said postage meter machine for postage calculation using weight data communicated to said postage meter machine from a scale, including a location-specific initialization of said postage meter machine;

calling data and automatically checking whether the most recent status of stored data, stored with a date in said postage meter machine has been modified by comparing current date data with the date of the stored data;

offering updated location-specific data for said postage meter machine from external memories if said date of said stored data has passed; and

updating the stored data, to obtain updated data in said postage meter machine using said updated location-specific data communicated to said postage meter machine from at least one of said external memories and using said updated data in said postage calculation.

8. A method as claimed in claim **7** comprising offering location-specific window data for at least one of a postage stamp and auxiliary functions of said postage meter machine and current information for configuring said postage stamp via a communication network connected to a memory containing fetchable data blocks for reloading auxiliary functions and said current information and for updating data into said postage meter machine.

9. A method as claimed in claim **7** comprising offering a location-specific list from a remote data central to said

postage meter machine for entering a carrier identification number into said postage meter machine corresponding to a name of a mail carrier for initializing said postage meter machine, said location-specific offering of said list being loaded from an external memory via a communication network between said postage meter machine and said remote data central.

10. A method as claimed in claim **7** comprising the additional steps of:

storing a fee schedule in said postage meter machine for each mail carrier among a plurality of mail carriers, each fee schedule having a minimum validity duration associated therewith; and

upon selection of a new mail carrier by said postage meter machine, automatically dialing a remote data station to obtain a new fee schedule for said new mail carrier if the minimum validity duration of the fee schedule for the new mail carriers stored in said postage meter machine has been exceeded.

11. A method as claimed in claim **7** comprising the additional steps of:

offering location-specific window data for at least one of a postage stamp and auxiliary functions of said postage meter machine and entering current information for configuring said postage stamp using a first transmission means; and

entering a user-specific setting of said postage meter machine using a second transmission means.

12. A method as claimed in claim **11** comprising using an integrated chipcard as each of said first and second transmission means, said chipcard having a memory with fetchable data blocks for reloading updating data and said auxiliary functions.

13. A method as claim in claim **7** comprising the additional steps of:

changing a location of said postage meter machine to a new location; and

upon said postage meter machine being switched on at said new location, entering a postal zipcode for said new location into said postage meter machine automatically via a transmission means connected to one of a mobile radio telephone or a communication network and thereafter completing initialization of said postage meter machine at said new location.

14. A method as claimed in claim **13** comprising the additional steps of:

during initialization of said postage meter machine, forming a communication requirement including request data and communicating said communication requirement from said postage meter machine to a remote data central in a communication path including a local switching center; and

identification of the location of said postage meter machine being automatically inserted into said communication requirement and request data sent to said remote data central from said local switching network, and information identifying the location of the postage meter machine thereafter being automatically included in all communications from said postage meter machine to said data central.

15. A method as claimed in claim **7** comprising offering a location-specific list from a remote data central for entering a postal zipcode into said postage meter machine during initialization of said postage meter machine and offering location-specific data to said postage meter machine from an external memory via said communication network.

16. A method as claimed in claim **15** comprising the additional steps of:

changing a location of said postage meter machine to a new location; and

upon said postage meter machine being switched on, entering a postal zipcode of said new location into said postage meter machine via a keyboard during initialization of said postage meter machine.

17. A method as claimed in claim **15** comprising the additional step of:

transmitting a telephone number of a location at which said postage meter machine is located to a remote data central;

evaluating said telephone number at said remote data central; and

at said remote data central, allocating at least a portion of said telephone number to a stored, allocated portion of a franking image.

18. A postage meter machine comprising:

a processor;

a user-operable input unit for entering signals into said processor;

reception means for receiving data from a remote data source at a location external to said postage meter machine;

a write/read memory connected to said processor;

a clock/date module for offering information identifying time and date to said processor;

transmission means for establishing communication between said remote data source and said reception means; and

said processor comprising means for, in response to a signal at any arbitrary time from said input unit, formulating a request for a fee schedule including request data identifying a country and a location in said country of said postage meter machine and a time and date from said information from said clock/date module, and for transmitting said request to said remote data source via said transmission means and for receiving a first fee schedule, dependent on said request data, from said remote data source via said reception means, said fee schedule having a validity date, and for loading said first fee schedule into said write/read memory, and for automatically comparing said validity date with said information offered by said clock/date module and for, if said validity date has expired, automatically formulating a new request for a fee schedule including new request data updated as to country, location and time and date and for automatically transmitting said new request to said remote data center and for receiving an updated second fee schedule, dependent on said new request data, via said reception means, and for loading said second fee schedule into said write/read memory in place of said first fee schedule.

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Reference U

Minutes of the Mailers' Technical Advisory Committee

December 10-11, 1997
Benjamin Franklin Room
U. S. Postal Service Headquarters

Welcome

Chris Rebello, Industry Chair, called the meeting to order and welcomed the members. Administrative announcements included a planned change in the fourth quarter 1998 meeting, moving it into January 1999 to avoid conflicts as a result of seasonal peak loads both within the USPS and in some of the member companies. There would also be a change in the distribution of the Federal Register announcements germane to MTAC because many members receive the notices from other sources.

Recognition

Art Porwick, Postal Service Vice Chairman, also welcomed the members, including new members Charles Howard, Pat Bresser, Gary Garvey and Kimberly Walts. He described two seminars that might be offered at the Postal Forum. The first will be related to the use of technology to grow mail business, and the second will focus on mail room managers and other key company managers, to help identify ideas across the management spectrum to improve the operations. Members with ideas to contribute to either seminar were encouraged to contact the Postal Service.

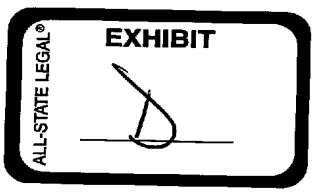
Mr. Porwick introduced Nick Barranca, Vice President of Operations, who discussed the fall mailing season operations. The Postal Service monitors the full range of classes during the entire year to identify times when special attention to a specific class is required. The actual volumes for each period are compared to the average volumes in each for the entire year.

Fall Mailing Season - Nick Barranca, Vice President, Operations

This year, there are 17 BMC annexes, a special network for non-machinable outside parcels, projections for the load that is anticipated at the BMC level, and special attention has been directed toward DSAS and the inclusion of the Business Service Network. The volume survey revealed that Priority Mail has grown 13.5% and Flats have increased 7.7 percent, both significant numbers in terms of service quality. The increase has caused a shift in Standard A volume to flats, which are entering the system mainly at the SCF (BMC entry volume is up 2.1% versus an increase of 19.8 at the SCF).

In the specific area of failed vans, the numbers have been consistent over three years, which indicates that BMC performance has been consistent during that period. The numbers show that the same consistency exists for First Class and Preferred incoming at plants. However, the service level for incoming periodicals show an increase in delays over the three-year period, a trend that has been sharply reversed in the last three weeks.

In summary, Mr. Barranca noted that BMC, First Class incoming, and performance at delivery units have all been consistent for the last three years, and the problem areas are flats, and particularly periodicals. These delays began at the last reclassification, with a change in mail makeup that affected workflow, and continued through the year. During the UPS strike there was better performance, but it dropped off immediately thereafter, probably because the strike stressed the workforce to a point where a letdown occurred when it was over.



In accounting period 3, the DSAS began to produce customer complaints about appointments, and concerns about mail transport equipment. The fall stockpile of GMPC inventory was depleted during the strike and are just now coming back into the system. The whole mail transport equipment (MTE) system has come under stress because customer demand is increasing. Delays occurred after the strike in Standard A and periodicals, and in-home dates slipped. In response, there was a high level meeting that resulted in a communication to the ABP's to become proactive in talking to customers about concerns. A group of 69 customers at the national level were contact once a week to gather information about these concerns and immediate solutions are pursued.

There will be a specific effort to understand the problems related with the appointment system, in which cancellations and no-shows average over 35%, and the on-time record for customers is poor. Data on both sides will be collected -- the Postal Service acceptance rate and the customer performance in response to accepted appointments. There is also a program to track MTE through a regular reporting system. The in-home performance is being tracked --by customer, by dates, by delivery unit, with a reason for the missed date.

The focus is now expanding to First Class, Priority and Standard B, and these will be added to the daily and weekly monitoring process. The peak cancellation day will be December 15 and the peak delivery day will be the 17th, and deliveries are running ahead of last year.

Marketing estimated a 30% growth and the resources have been put in place to handle that load. In the air there will be 108 additional aircraft, on average larger, with 39% more capacity. Add the PMPC network with 124 aircraft has 29% more capacity. There is a national rollerbed network that allows containerization off-site, more surface trips are scheduled, and an expanded HASP network. There will more reliance on surface transportation to make the air more responsive.

The national operations center will be open 24 hours a day to track and respond, and there will be daily communications and analysis at the district level (5-digit, parcels and Priority), the AMC operations, the BMC's (parcel processing) and in January the monitoring will continue on a weekly basis.

Discussing reclassification, the Postal Service anticipates eliminating the mixed pallet when there is an assured supply of sacks, pursue presort optimization, especially at the SCF level, and improve deployment of equipment

Mr. Barranca outlined next steps in improving service, including a stronger focus of planning, clarifying the steps that are necessary to attain true customer satisfaction, and moving into process indicators (rather than relying solely on pure production indicators). The growth trends in the various classes suggest changes in the network requirements, especially the growth of Standard A, and might be an analysis of the current system versus the actual processes that customers use to get mail into the system. The Postal Service would like to rely more on MTAC expertise in making decisions. .

During discussion, John Wargo explained the criteria for choosing the 69 customers for the monitoring process (mainly catalog companies and large retail mailers). Mr. Barranca discussed the improved trend in 2- and 3-day service (which is a result of the weekly customer contact), mentioning a number of specific actions being taken to enhance the improvement. He especially noted that the inclusion of process data will make the job easier to accomplish.

Responding to a question about the Business Service Network, the BSN is the link between the customer and the Postal Service problem resolution teams at the BMC and SCF levels. There was a brief discussion about whether or not the SCF sack could be reintroduced.

There was a suggestion to share data collected in the daily and weekly monitoring efforts, and Mr. Barranca agreed that some data should be shared and the Postal Service would look at the best way to provide that information to mailers. There was also a suggestion that service improvements (in periodicals, for example) should not be implemented at the expense of some of the classes that are not presently in the problem category (like First Class).

There was a brief discussion about the refusal of pallets that was the result of mailers showing up with far more pallets than the appointment schedule anticipated. Mr. Barranca agreed that the system should use such limitations to regulate flow of mail and assured the members that it would be investigated.

Finally, there was a request that the Postal Service make a special effort to ensure delivery of parcels and Mr. Barranca explained the measures that were being instituted for the fall season to assure such delivery in a timely way

Ease of Use Indexes - Mike Shinay, Acting, Vice President, Consumer Advocate

Mike Shinay presented an explanation of the "Ease of Use" index, noting that the Customer Perfect programs aims at improving customer satisfaction, which has five goals: timely delivery, accurate delivery, affordability, consistency and ease of use. As part of that program, there are measurement systems to gauge the success of those goals. The EXFC for First Class Mail is an example.

A second indicator is the "Ease of Use" index measurement, which targets residential customers, business accounts (small and large), national and premier accounts. The definition of ease of use states that products and services must be simple, convenient, understandable and accessible. It is different from timely delivery/EXFC in that it is built upon responses provided directly by customers. It is results indicator of success.

The Gallup organization will develop and administer the surveys, which are composed of two types of questions. The first type solicits opinion on a poor-to-excellent rating basis, which are then quantified in a unique formula. The second type are diagnostic questions that require a *Yes* or *No* response, and those responses are also quantified.

The questions were selected from existing surveys, and each was tested in various ways to ensure that the most important questions were selected. The questions chosen had to have almost universal applicability so that each could be answered by almost every respondent. Finally, the scoring and formula were kept simple enough that an individual could rate a test using a simple calculator.

Mr. Shinay provided specific examples of questions, scoring and results calculations in each of the customer categories. Each set of questions asked the same kinds of questions: Was the encounter helpful and courteous? Were the rules and forms reasonable? Was the experience satisfactory?

Data calculations are to be reported to the field. Results are reported on a national average basis for confidentiality reasons. The surveys provide information for policy and decision-makers, and the results on a local basis will become a part of the variable pay system in fiscal year 1998.

Responding to a comment that it is sometimes the Postal Service employee who finds the rules and regulations confusing--Mr. Shinay commented that the survey would provide guidance for education programs to enhance the skills of employees. The results will also be useful in developing public relations programs, and for simplifying the rules and regulations. The plan is to develop a baseline for all of the information gained from the survey so that service trends can be tracked.

National Postal Museum Update - Jim Bruns, Director

Jim Bruns stated that the Postal Museum opened in 1993 as a joint venture with the Smithsonian Institution. Two stories were not told when it opened, the direct mail story and the state of automation, primarily because the expertise was not available at the time to create the displays. Now, five years, later, the expertise is available, including two members of MTAC, and the exhibits will be added.

The new exhibits are exceptionally imaginative, employing cutting edge technology and a truly exciting approach for visitors. It will be highly interactive in a "fun" way, creating a mail piece out of each customer, who can choose what "class" he or she wants to be "mailed" through the automation exhibit. Each visitor will be weighed, postage will be attached, discounts applied if appropriate, and the "mail piece" will be guided though the exhibit by imaginative and entertaining characters. Virtual reality will also be integrated into the exhibit. The exhibit will be computer-driven so that technology changes can be easily integrated.

As with other exhibits, the automation exhibit will be educational as well as entertaining, teaching the visitor about the process, but also teaching them how important it is to prepare mail properly. The developmental level of the exhibit will be sixth grade education, to insure that it has broad appeal. The exhibit should open by the end of 1999.

The funding for the exhibits does not come from the Postal Service, but from sponsors, usually in the private sector. The goal is to obtain about $2 million from these sources for funding this exhibit.

Update on Fast Forward and the New York Key Program - Mike Murphy

Mike Murphy discussed the Fast Forward program, noting that mail volume was around 97 billion pieces, having increased about a single percent each year for the last couple of years. The Address Change Service is increasing at a far greater rate -- 2 billion records in 1995, 4 billion in 1996 and over 7 billion in 1997. The mail processed through the forwarding service, about 1.7 billion pieces, increased by 2%.

In the mailing list correction service, which is client-server based, in AP 1 alone, 30 million addresses were processed with a 2.5% match rate. In the multiple-line OCR readers, with more machines, a total of 57 million since deployment in AP 10 with a 1.19% match rate. By comparison, the NCOA, which processed 80 billion addresses last year, has a 4.27% match rate.

In January of next year, the changes in the endorsement will become mandatory (since July either old or new endorsement has been accepted).

The New York Key program, which is a process to encourage the use of apartment numbers in high density areas like New York City, has been in review in house, and it has been deferred.

Year 2000 - Richard Weirich, Vice President, Information Systems

The Year 2000 challenge involves a major effort to avoid problems that can occur when computers, programmed in two-digit year identification, suddenly have to deal with two zeros for the year 2000. The problem resides in software and in systems that rely on computers. In the Postal Service, adjustments are being made to operating software, applications, hardware which is reliant on the two-digit identification and so on. There is a Year 2000-Initiative office managing this for the entire system, which began looking at the problem in 1993. In fact, the bulk of the software adjustments will be made in 1997 and 1998, and there are more than 500 active projects.

The address change Service has been modified with a four-character year change and it is operating well. Many of the other systems have been similarly modified with a four-digit adjustment, or with a windowing process that causes the computer program to recognize a "00" date. The CFS system for modifying address changes is already in modification for other reasons and the date aspect will be included.

The Locatable Address System and the National Change of Address program will be updated by January. The Fast Forward system was built to be compliant, but the individual computers used in the process must be checked. The permit and postage statement forms available on the Web are set up properly.

MTAC members will see information about the changes and the schedule of changes beginning in January, and feedback would be appreciated. The current activity in the Postal Service is a complete review of the process, since a major challenge is getting all of the pieces to come together correctly. Most changes will be completed in this fiscal year. The first quarter of the next fiscal year will be the debugging period, followed by a stabilization period and a freeze in late 1999, when there will be no changes made until the system moves into the year 2000.

Responding to an inquiry about providing information on the Year 2000 compatibility of workstations used by customers and other external parties, Mr. Weirich stated that there were no current plans for the USPS to do this. There are, however, other sources of such information and he agreed to look into providing links to such information from the USPS Web site.

Global Initiatives - James Grubiak, Vice President, International Business

James Grubiak discussed the objectives of the International Business group: improving service quality, focusing on critical market segments and key countries, and implementing new service to meet or exceed customer expectations.

The Board of Governors approved a $500 million budget to develop separate service centers to move mail across international borders. Teams have been formed and sites have been selected (San Francisco, Los Angles, Dallas, Chicago, Miami and New York). The system has been organized around the special requirements of international customers -- mail orders, financial services, publications, small business and consumers, expedited mail, the industrial marketing, and logistics across borders. The independent service centers will take about two years to get to full operating speed.

The commercial needs of customers include moving catalogs efficiently across borders, providing high impact priority mail for intermediate delivery times, direct entry for customers who want a local postmark. Global Package Link was introduced in Japan successfully with over 30 customers and two mailings a year. Since then Canada and the United Kingdom have joined, with agreements signed with China, Chile, Brazil, Mexico and France. There are major sales events scheduled for China in February. There was exceptional pressure from other shippers to stop the Postal Service from implementing Global Package Link, all of which has been resisted to date.

Long term objectives include expansion into a much broader range of countries, a positive program to help domestic companies enter the international direct marketing business, expand direct entry and bulk service in-country services, focusing on the publishing segment and increasing awareness of the international services available.

Mr. Grubiak noted that revenues from initiatives have increased, although revenues from letter class mail have declined. Terminal dues are in negotiation, with pressure from the European Union to join the Reims Proposal, a higher rate pricing strategy. There was a suggestion to make the Aerogramme product compatible with laser printers

Commenting on the IPC, Mr. Grubiak said it was formed around European needs, an aggressive team made of up members from Europe, Canada and the U.S., working on improving service, especially in the under-developed areas.

Prepaid Reply Mail - Yvonne Reigle

Yvonne Reigle discussed the Implementation Readiness Team for prepaid reply mail, not an official MTAC working group, she noted that part of the July 1st rate case announcement, specific types of mail would be allowed to enjoy a special rate. One of the applications was for remittance mail, which requires the business mailer or service provider to offer a prepaid reply mail privilege to customers. The USPS would have approve. The end user, the business mailer's customer, could agree to receive the prepaid envelopes, which would be billed back to the end user (whether or not the envelopes were used). The Postal Service collects the postage from the business mailer for actual envelopes mailed. The administrative cost to the business mailer is $1,000 a month.

There were a number of concerns articulated by the team. There is a potential added burden on the customer care people because of increased inquiries from end users. There was a question about the process of replacing lost envelopes and providing refunds to the customer if the envelope is not used. There are administrative costs related to installing this in the business mailers environment, putting this new customer charge into the system, controlling the additional mail stream within the company to track those customers who choose the envelopes and those who do not, and the cost of the auditing process to keep track of the envelopes used.

There was a brief discussion about the cost of the service, which is the same as a business reply envelope, and about the billing procedures to the customer and to the business mailer.

MTAC Information System (MITS) Update - Joseph Lubenow

Joe Lubenow explained that, to reach MTAC news, go to _ HYPERLINK http://www.usus.gov www.usps.gov_ on the World Wide Web, then choose "Business" then "Ribbs" then "MTAC". Members are encouraged to submit personal e-mail addresses to MTAC (e-mail the address to dadona@email.usps.gov).

The MTAC and the public can reach the page and learn about MTAC, including the minutes of the working group meetings, but only those MTAC members with appropriate passwords can add or amend documents on the web. Passwords will be required to reach the page containing the MTAC roster. Those passwords will be provided to MTAC members as soon as possible.

There was a brief discussion, the substance of which concerned the importance of completing this process promptly, and ensuring that information about MTAC, and especially the working groups (members, meeting dates, etc.) is posted on the web.

Opening Remarks (Second Day) -- Joseph Schick, Industry Vice Chair

Joe Schick called the meeting to order and expressed appreciation to Delores Adona for her excellent supervision of the meeting functions.

Financial Update -- Richard Porras, Vice President, Controller

Richard Porras shared the final results of fiscal year 199, adding that the printed financial statements would be available within a few weeks. The 1996 annual report received awards from the Communications Association and Financial World Magazine.

The bottom line for 1997 was a net income of $1.264 billion versus $1.567 billion for the prior year. Expenses and revenue grew about the same, a little over 3%. Looking at the plan for the year, gross revenues, although up more than 3%, fell short of the goal of a little over .4%. There was
a special charge to the expense side related to the POD Workmen's Compensation liability of $258,000. This program applies to about 1,700 individuals injured before 1971, with an average age of 77. There has been and is some abuse in the system and the Postal Service is aggressive and serious about pursuing any such unauthorized payments.

Mr. Porras demonstrated the improvement in net capital deficiency (which originated in a capital contribution from the federal government and cumulative losses over the years) that comes from the net profits made during the last few years. Nonetheless, there are still cumulative losses and negative equity at the moment. The figure currently is a cumulative loss of $4.394 billion and negative equity of $1.36 billion.

Changes in revenues by class were revealed, showing the solid increases in Priority Mail (up 16%) Express Mail (11.9%) and Standard A (5.8%). The only decline was in international operations. Increase in mail volume for 1997 was 4.1% overall, the largest increase since 1988, and more or less matched the percentage increases in revenues.

Budget control has been excellent since 1992, evidenced by the stabilization of the expense ratio (to revenues) of about 5%, and productivity has improved to 1.6%. Net income trend has been solidly positive. This positive performance has served to maintain rates at less than inflation.

In summary, 1997 produced a net income of $1.3 billion with record total mail volume of 190.0 billion pieces of mail and a reduction in negative equity to $1.4 billion.

During the first two accounting periods, compared to same period last year, revenue is up 2.7% and expenses 1.7%, except there are some exceptional expenses that will arrive later in the year. In terms of the budget, revenue is lagging planned by $96 million and expenses under plan $140 million, and the net is $55 million ahead of plan. Preliminary volume figures show Standard A up 5% and First Class up 1%. The cost of Year 2000 has been budgeted at $100 million and outside sources have suggested we have understated that estimate.

There was a brief discussion to clarify the mechanics of the improved negative capital and to define the impact of the profits with relation to future rate cases. In response to a question about the EFT 99 Regulations (electronic fund transfer), Mr. Porras stated that the Postal Service was not a part of the process, but was concerned about the inability to convert paychecks to EFT (over 300,000 are written every month) and the fact that an EFT can displace two pieces of mail, which can have a major effect on First Class as it becomes more common.

Recognition and Appreciation -- Arthur Porwick, Postal Service Vice Chair

Mr. Porwick, on behalf of the MTAC, recognized Carol Overkott's years of service as the key staff person for MTAC, and presented to her a gift of appreciation.

PaperCom -- Maynard Benjamin, President, Envelope Manufacturers Association

Maynard Benjamin , speaking as executive director of PaperCom, explained that the group was formed to provide a voice for those businesses and associations who rely on paper-based communications. Technology has contributed to the importance of paper as a communications tool.

Mr. Benjamin described some of the technology that is germane to paper, including the application of phosphorescent ink, invisible to the naked eye, but readable under a specialized scanner, that would allow adding information to a letter or envelope, including tracking information. He mentioned betagliphs, small stamp sized imprints that can contain a large amount of data, again readable with a special reading device.

PaperCom is not a lobby representing any business. It exists to present an unbiased presentation of the role that paper can and will play in the communications world. The rationale for supporting the effort is based on the fact that there is no voice for paper-base communication, the major companies in telecommunications do no consider paper important to the business, and the financial community sees paper as an older, less viable technology.

Activities of PaperCom will include research on the subject, the publication of policy papers on paper-based communications, studies on the value of paper in various venues, publication of a resource guide on all research on paper-based communications, development of shared advertising programs, and sponsorship of speakers for various interested forums. Future activities will include policy briefings for legislators and business executives, a technology summit meeting, white papers and research on consumer and business value of paper-based communications.

PaperCom began with 5 organizations and has expanded to 22 at present. The Postal Service supports the group through the proffer of advice and counsel.

Work Group Updates -- Joseph Schick, Industry Vice Chair

Joe Schick opened the session with updates from most of the working groups.

ABE Technical Advisory Group -- Anita Bizzotto: New feeder guides have been deployed to reduce skewing of mail pieces that resulted in false readings from an acceptable piece. New software with enhancements for skewed mail, changed tolerance for grading skewed mail, and solved the mapping of short bars. Test decks were sent to the field for use when the equipment rejects mail. Before the mail is formally rejected, the test deck must prove that the machine is operating properly. There is a 60-day test on the equipment to insure that equipment operation is proper, that the personnel are trained, and that the system is ready for implementation at the end of the test period (February). On implementation, testing of customer mail would be conducted on a progressively reduced sampling basis as long as the samples tested pass. Score to pass initially will be 70%, ultimately 95%.

Planet Code Work Group -- Paul Bakshi: Readers can differentiate between Planet Code and other barricades. Applications include confirming at origination and at destination. The code is placed on the reply mail piece and, as processed, the reader captures the information and, within hours, the time and place of processing is available to mailers. Destination confirmation provides the same information at the destination, with the assumption that delivery is imminent. Applications by mailers include initiation of telemarketing, staffing in anticipation of customer inquiries (e.g., when bills arrive at the residence). The Planet Code provides electronic proof of mailing which obviates the need to pay for mailing certificates. The work group has formed subcommittees to look at technical (software/hardware), business, administrative, marketing and product-related issues. Testing capability exists, by July enough equipment will be in place to handle all originating mail, and by the end of 1998 deployment should be complete.

Form 8125 Work Group -- Rick Kropski: The work group has not met since last MTAC meeting, and is awaiting revision of Form 8125 from the Postal Service (expected in January).

Drop Ship Appointment System Enhancements -- Rick Kropski: The Postal Service is providing strong support in the Work Group. Issues examined at the last meeting included a planned test of the distribution of demand for appointments, both availability and demand. This survey should also reveal some of the practices that cause problems (late shows, no shows). The test is scheduled for February. For current appointments, the close-out information will be placed on the World Wide Web site. There is a Postal Service planning group in the initial stages of developing a new, improved DSAS. During two accounting periods no shows have been tracked, and the data will be audited for accuracy. Nationally, the no show rates is around 25%.

Package, Container & Pallet Integrity -- Russell Shores: There have been two meetings since the last MTAC meeting, including a sunset meeting. Issues handled included the mixed BMC/ADC pallets of flats, which has required a lot more labor than appropriate in re-sacking. In many areas, packages and flat mail have not maintained integrity that causes exceptional slowdowns. The Postal Service has accumulated data on problems related to periodicals packaging (often caused by overweight packages). Concerning the BMC packaging problem, there is apparently no technology that will survive the processing on the BMC equipment (except for the few that have small parcel equipment). Hand-written sack and tray labels continue to cause problems; all should be barcoded and a change in specs was announce recently. The Work Group has been ended, handing off future concerns to a group in the Graphic Communications Association (Printer Operational Issues Study Effort Group).

Mr. Lubenow announced that a Work Group on Preparation of Trays on Pallets has been approved. Jim Bowler will be the leader.

Container Tracking -- James Schemmel: The Work Group will be absorbed into the Unit Load Tracking Work Group.

Information-Based Indicia Program -- Laine Ropson: The Work Group has met a number of times to explore possible uses apart from evidence of postage. It may be a useful data source. Over forty services were identified, reduced to nine topics of interest to the mailing community. To determine if these topics are appropriate, a survey was developed for MTAC members. The topics include: tracking mail, notification of undeliverable mail, casual mail, certificate of mailing, use for ancillary services, for automated acceptance verification processes, for date certain delivery, office management and manifesting. Five questions will be asked: Is it useful? Can charges be levied for the services? To what segments of the mail would the services apply? Are there concerns about the IBIP? Can it be used not tied to evidence of postage?

Surveys were distributed to MTAC executives, with the additional request that the surveys be distributed to individual association members for tabulation into a single response, plus a survey for the association representative. The next step will be to determine what mailers want versus what technologies are available and what the vendors can deliver. The schedule anticipates return of the surveys by February 16, with a report at the next MTAC meeting in March.

Presort Optimization -- Joe Lubenow: The Work Group is discussing live mail tests on the suppression of overflow trays. Two prime contractors have included this option is software development in anticipation of approval of the option. Final rules on SCF sacks will be published in the Federal Register. There is a 3-digit and SCF pallets optimization process that will be in the software by the time the rate case is implemented. Look for the LOO-1 list, a 5-digit scheme for pallets and possibly carrier route sacks. Finally, there may have to be an effort to document or validate advance reverse presort before the Postal Service will accept something like that. All three major software vendors are participating in the Work Group.

Mail.Dat -- Rosemary Hamel: The Work Group exists to promote the use of Mail.Dat and to address issues that arise relative to the standard. A two-day working session in October discussed issues related to making the standard work in the mailing environment. There were some changes recommended, with another meeting in February to develop a strategy for implementation of those recommendations. There is also a user's guide in development. Volunteers for that effort are needed (contact Dan Minnick). Software has been developed to displace the hard copy documentation necessary at the present time

Direct Link -- Rosemary Hamel: The Work Group has been tracking the pilot test program. The first phase looked at data, looking for accurate compliance with the Mail.Dat format. The current phase is looking at the business process to determine if the system works as designed. The presentation of the data is now posted on the Internet, available to the mailers involved. There is also a test of linkage to the DSAS through the posting of the electronic Form 8125.

Parcel Barcode Clarification -- Julie Rios: The Work Group has arrived at a barcoded symbol for packages, which has the addition of parallel bars at the top of the barcode for ease of recognition. The barcode will contain multiple special services and a specific product code, which will eliminate a lot of the current labeling requirement for special services. The only outstanding issue before publication is the unique mail piece identifier. The BMC's have been asked to gear up to read the new UCC EAN 128 codes when implemented. Finally, there is momentum to establish an international barcode standard and the Work Group is looking at the implications of that effort. There was a brief discussion about whether the decision on the barcode may be premature, considering some of the other developments (the IBIP, for example). An important consideration is the fact that the widely distributed hand-held barcode readers are not capable of reading two-dimensional barcodes.

Parcel Reclassification Implementation -- Ernest Collins: The Work Group is examining alternatives to affixing Form 3813P to each piece mailed thorough the bulk parcel insurance rate, and identifying the rate categories of pieces mailed at origin presort rate. Another issue is the minimum quantities and/or types of containers that may be used for BMC and origin presort, and DSCF rates. A fourth issue is the restriction on the number of pieces in a mailing that can exceed the 108-inch size.

1997 Fall Service Standard -- Pat Mendonca: The Work Group is looking at operational changes and issues related to mail transport equipment, bulk mail centers, plants, delivery units and the Business Service Network. The customer's use of the BSN was discussed, identifying specific issues about parcels as Standard A or B or Priority. The recommendation of the Group was to continue, expand the focus of the group and to develop a team to define and document the problem resolution process at the BSN.

Return of Opened Parcels -- Sherry Suggs: The Work Group approached consensus on the opened parcels issues, but another meeting will be required to conclude.

Small Mailer Information -- Peter Moore: The small mailer information pamphlet shown to MTAC at the last meeting has been improved. It will be completed in five weeks.

Address Coding Enhancement -- Robert O'Brien: The Work Group identified about 20 impediments 100% bar-coding and each impediment has been assigned to a task leader to examine. Their comments will be on the MITS. There are a number of incremental improvements that have been or soon will be implemented. Significant improvements were made by adding
911 for the LAX system for 1998, and new processes have been implemented to reduce lag time in getting new address data onto the zip plus four database, which will help coding. There have been improvements in synchronizing zip code realignment data between AMS and NCOA. The Work Group is looking at ways to improve the address element correction system, perhaps by encouraging private sector solutions. The colleges and university group, working with the Postal Service, has arrived at an action plan that covers a number of initiatives that will be completed before the Postal Forum. There will be a study of uncodeable address files that will be useful in testing the feedback process for non-postal delivery addresses.

Centralized Postage Payment (CPP)/Direct Link -- Howard Funck: This Work Group is focused on large magazine and some newspaper publishers concerned about, working the CPP into the Direct Link environment. The Group and the Work Group should be dissolved. Currently there are publishers paying for postage in other programs, but all will have to be in the Direct Link program by July 1998. Issues that will continue include technical problems like defining ad space with regard to rate qualification. Publishers would like to see the numbers before mailing, and a 48-hour delay has been approved by the Postal Service.

Blue Ribbon Committee of Sharing Data -- Howard Funck: This Committee was formed to look at sharing data such that mailers can gain access to Postal Service cost and revenue data for the purposes of developing trends. This information gives the mailers something to work with as the rate case process proceeds.

Publication Watch - Joyce McGarvey: The Work Group has decided that a definition must be developed for the Publications Watch program, which will include the means to electronically transmit a periodical service compliant to a central database, probably Consumer Affairs. It will have a tracking number, and the Postal Service will follow up on the compliant. The Group that PRESS had not worked but might have something salvageable to include in the new system. Next meeting is late January.

Periodical Service -- Tom Tulley: The Group has established several committees including makeup, acceptance, processing and information systems. Each committee will meet before the Postal Forum to develop goals and objectives.

Improving Standard A Catalog Mail Delivery -- Liz Morris: The Group has access to excellent data from the Mail.Dat system that has been merged with information from the Decoy System. An analysis design is being created to compare data from that source and others with what is occurring in the field. The ongoing field test will expand during the next three months. Measurements include transit time (point of entry to customer's home) and confirmation of delivery.

Increasing USPS Capital Spending Levels -- Joseph Schick: The Work Group anticipates a link to Information Systems, and it has become apparent that there must be a database related to capital spending. Currently it is sometimes difficult to justify capital expenditures on items(such as some software) that do not clearly increase income or reduce labor costs. There is also a need for bringing outside groups and vendors together to help develop new technology. Information has been provided on each mail product to identify the aspects that are important to the customer, the data required to run the business, the information needed to support future technologies, and the Postal Service's information systems support requirements. This information should be included in planning future needs.

Pricing Flexibility Within Current Framework -- Vince Guilliano: There has been little activity. The Group is waiting for the rate case to be submitted before meeting probably in January.

Improvement of Acceptance and Certification -- Ralph Moden: This Group met during the MTAC meeting. A survey has been placed in the AMMA Bulletin requesting input on acceptance issues.

Definition and Publication of Service Standards -- Ralph Moden: Jerry Jensen has agreed to lead this work group and there will be a meeting in January.

Communication Committee -- Lori Ware: The new member orientation program will be updated to reflect the new structure and responsibilities for all of the individuals and groups in the MTAC, the revised bylaws and so on. The update should be complete in March and the information will be presented to the general membership as well as new members.

There is a brochure in development that explains the MTAC mission and makeup that will be available to distribute to the industry, legislators and other interested individuals and groups.

Ms. Ware commented that the perceived value of MTAC seems to have declined in the last few years and there will be an effort to develop an annual report that emphasizes the accomplishments of the group. It is intended for the Postmaster General, but also for the associations and groups that support MTAC with dues and individuals support. The work group members will be encouraged to post information on the MITS web page.

Finally, attendance will be encouraged so that members will plan to remain from the opening welcome to the final report of the second day meeting.

Ms. Ware announced that three sessions would be offered a the Postal Forum. There will be a novice session that describes MTAC and introduces individuals to the workings of MTAC. Another session will move to an intermediate level, with more information on the nuts and bolts of what MTAC is about. The third session will be targeted specifically at Postal Service employees, to increase awareness of MTAC in that group.

Adjournment

Mr. Porwick closed the meeting with a comment that the year had been a challenge as the new organization structure was implemented. He expressed appreciation to Mr. Rebello and Mr. Schick for their exceptional efforts in accomplishing that transition.

TABLE OF CONTENTS

TABLE OF AUTHORITIES

REAL PARTY IN INTEREST:

The real party in interest is the assignee of the application, Francotyp-Postalia AG & Co. KG (now doing business as Francotyp-Postalia GmbH), a German corporation.

RELATED APPEALS AND INTERFERENCES:

There are no related appeals and no related interferences.

STATUS OF CLAIMS:

Claims 1-14 constitute all pending claims of the application. All of claims 1-14 stand as being finally rejected in the Office Action dated March 17, 2008. No claim was added or cancelled during prosecution before the Examiner.

STATUS OF AMENDMENTS:

No Amendment was filed subsequent to the Final Rejection.

SUMMARY OF CLAIMED SUBJECT MATTER:

Independent claims 1 and 14 are the only independent claims of the application, and are reproduced below with exemplary citations to the present specification. Figures 1 and 2 of the application as originally filed are attached hereto as Exhibit A.

1. A mail-processing device comprising:

a programmable memory having a table stored therein containing a plurality of product codes (EEPROM 2 in Fig. 1; p.7, l.25 - p.8, l.2);

a program memory containing an operating program to generate print data for a franking imprint to be printed on a mail item (EEPROM 4 in Fig. 1; p.5, l.17-19, p.7, l.19);

a working memory having mail-item-related data values stored therein (RAM 5 in Fig. 1; p. 10, l.24);

a keyboard having a plurality of operating elements allowing manual entry of said mail-item-related data values for said mail item into said working memory (keyboard 9 in Fig. 1; p.5, l.20-22);

a microprocessor in communication with said programmable memory, said program memory, said program memory, said working memory, and said keyboard (microprocessor 7 in Fig. 1; p.7, l.18-23);

said programmable memory, said working memory and said microprocessor, in combination, being programmable by said operating program to set an operating mode for automatic product code entry (p.19, l.17 - p.10, l.7; p.11, l.17-23); and

said microprocessor being programmed in said operating mode to evaluate said mail-item-related data values stored in said working memory and to automatically select an applicable product code from among said plurality of product codes stored in said table stored in said programmable memory, and to generate print data for a franking imprint for said mail item that includes said applicable product code (p.6, l.10-19, p.10, l.1-13, p.11, l.17, - p.12, l.17).

14. A computer-readable medium encoded with a data structure for a mail-processing device having a programmable memory (EEPROM 2 in Fig. 1; p.7, l.25 - p.8, l.2), a working memory (RAM 5 in Fig. 1; p. 10, l.24) and a microprocessor programmed to operate in an operating mode for automatic product code entry (p.19,

l.17 - p.10, l.7; p.11, l.17-23), and having a receiver unit (3, Fig. 1) in communication with the microprocessor, said data structure comprising a plurality of memory areas (p.9, l.7) in which are stored, respectively, an application program for said automatic product code entry and for generating screen images for shipping parameters on a display device (p.9, l.21-22), at least one first table in one of said memory areas and respective further tables in further memory areas to which access is enabled by said application program, said first table comprising columns of data values for valid shipping parameters and pointers to a weight table, pointers to a product code table and pointers to a weight class table (p.9, l.7-16), all of said tables being loadable from said computer-readable medium into said programmable memory via said receiver unit (p.9, l.19-23).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL:

The following issues are presented for review in the present appeal:

Whether the subject matter of claims 1-10, 12 and 14 would have been obvious to a person of ordinary skill in the field of designing mail-processing devices, under the provisions of 35 U.S.C. §103(a), based on the teachings of United States Patent No. 5,535,127 (Uno et al., Exhibit "B") in view of United States Patent No. 5,852,813 (Guenther et al., Exhibit "C") and U.S. Postal Service *Minutes of The Mailers' Technical Advisory Committee,* December 10 -11, 1997 (USPS Minutes, Exhibit "D"); and

Whether the subject matter of claims 1 and 13 would have been obvious to a person of ordinary skill in the field of designing mail-processing devices, under the provisions of 35 U.S.C. §103(a), based on the teachings of Uno et al. and Guenther et al. and USPS Minutes, further in view of official notice that it is known in the art for

drive devices to receive data from CDs and DVDs employed as storage data carriers.

ARGUMENT:

Rejection of Claims 1-10, 12 and 14 Under 35 U.S.C. §103(a) Based on Uno et al., Guenther et al. and USPS Minutes

The subject matter of claims 1 and 14 concerns a mail processing device and a computer-readable medium, respectively, that provide for the entry of a product code into a postage meter apparatus. As noted in the present specification, the term "product code" is a term with a specific, well-documented meaning in the context of mail processing, which the Examiner has apparently not only acknowledged, but relied upon, by virtue of the citation in the Final Office Action of the publication referred to as USPS Minutes. As explained therein, and as explained at page 3 of the present specification, a product code is a specific definition pertaining to a specific mailing category that is defined by the governmental postal authorities in many countries. The use of such a product code is required in countries such as Germany and Canada, but as of today, it is still not required in the United States, despite having been discussed in the USPS Minutes cited by the Examiner, which summarizes topics discussed at the Mailers' Technical Advisory Committee that took place over a decade ago.

In the countries that require a product code, the product code designates additional services, beyond basic mailing, that are requested by the mailer, such as overnight delivery, registered mail, etc. The product code in those countries must be included in the franking imprint according to the postal regulations in those countries, but this code is simply a number and therefore does not, by itself, provide any

explanatory information to a user who has not taken the trouble to memorize all of the relevant product codes. As explained at page 3 of the present specification, this necessitates extra steps by the user in generating the franking imprint because, when the user desires an "extra" service such as overnight delivery, for example, the user must look up the product code that designates that service and take steps to include it in the franking imprint that is generated by the user's franking machine (postage meter).

The USPS Minutes cited by the Examiner only mentions that the use of such a product code was, at that time, under consideration for implementation in the United States. Since the Examiner has taken "official notice" of other items in the Office Action, it seems that the Examiner could have, and should have, taken "official notice" of the fact that, despite over a decade of being considered in the United States, the use of a product code is still not required by the USPS as of today, and since the USPS has not required and does not require a product code to be included in a franking imprint for postal items mailed in the United States, the Examiner could also have taken "official notice" that the USPS has not provided any information to manufacturers of franking equipment (that must be approved by the USPS) as to how a product code can or should be entered into a franking machine so as to be included in the franking imprint. The USPS Minutes merely mentions the possibility of making use of a product code in future USPS regulations, but provides no information or guidance whatsoever as to how a product code entry can or should be made into a postage meter machine.

The Uno et al reference relied upon by the Examiner was filed in the United States Patent and Trademark Office on July 15, 1994, and is based on a Japanese

Priority Application filed on July 16, 1993. These dates are much too early for the subject matter disclosed in that reference to have any applicability whatsoever to entering a product code in a postage meter machine, so that the product code entry can, in turn, be included in the printed franking indicia, because product codes did not even exist at the time the application was prepared that issued as the Uno et al patent.

Equally as importantly, as explicitly stated in column 1, line 60 of the Uno et al reference, the mail processing apparatus disclosed therein is for the purpose of detecting physical quantities of mail *provided with a stamp.* Reading the information on the stamp provides one set of input information that is used for the processing, namely a processing charge of the mail. Other factors are then taken into account, as are generally set forth in claim 1 of the Uno et al patent. Therefore, the Uno et al reference is not concerned with *creating* a printed indicia on a mail item in fact, there is no printer at all disclosed in Uno et al), but is instead concerned with *reading* information from a *stamp* or other items that are already present on an incoming item of mail, and then undertaking further processing steps dependent on the information that can be read from the stamp, together with other information that are determined in the manner described in the Uno et al disclosure. There is not even an opportunity to make any changes in the stamp on the postal item disclosed in Uno et al, as would be a fundamental pre-requisite if one were going to consider using anything in the Uno et al reference as a basis, almost fifteen years later, for making a product code entry in a printed postal imprint, in view of the subsequent innovation of the use of product codes.

Of course, Appellant acknowledges that the Guenther et al reference, also relied upon by the Examiner, does disclose an automatic mail processing device of the type that must now be made compliant, at least in Germany and Canada, to now allow product code entries to be made. Since the Uno et al reference, however, is concerned with items of mail having a stamp thereon, and is not at all concerned with printing postal indicia imprints on items of mail, there is no reason whatsoever for a person of ordinary skill in the field of mail processing to even consult the Uno reference for the purpose of modifying a device of the type disclosed in Guenther et al. Moreover, even if such a person did so based on the "wish list" that is present in the USPS Minutes, such a person still would not be provided with any guidance as to how such a product code entry could actually be made. These references simply leave no alternative but the aforementioned manual entry, in terms of their disclosures.

Appellant respectfully submits that the Examiner has been able to formulate the rejection based on Uno et al, Guenther et al and the USPS Minutes only with the assistance of Appellant's disclosure, thereby impermissibly using hindsight as the basis for formulating the rejection. In view of the only recent innovation regarding the use of product codes, it is clear that none of the references relied upon by the Examiner can provide any guidance as to how a product code entry should actually be made in a postage meter machine of the type disclosed in Guenther et al. Appellant submits that even if a persons of ordinary skill in the field of mail processing had the insight to rely on a reference such as Uno et al, that reads information from a stamp on an item of mail, for the purpose of making a product code entry into a postage meter machine that will be used to print a franking imprint,

this would be an insight supporting patentability rather than a reason for precluding patentability.

The Federal Circuit stated in *In re Lee* 227 F.3d 1338, 61 U.S.P.Q. 2d 1430 (Fed. Cir. 2002):

> "The factual inquiry whether to combine references must be thorough and searching. ...It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with."

Similarly, quoting *C.R. Bard, Inc. v. M3 Systems, Inc.,* 157 F.3d 1340, 1352, 48 U.S.P.Q. 2d 1225, 1232 (Fed. Cir. 1998), the Federal Circuit in *Brown & Williamson Tobacco Court v. Philip Morris, Inc.,* 229 F.3d 1120, 1124-1125, 56 U.S.P.Q. 2d 1456, 1459 (Fed. Cir. 2000) stated:

> [A] showing of a suggestion, teaching or motivation to combine the prior art references is an 'essential component of an obviousness holding'.

In *In re Dembiczak,* 175 F.3d 994,999, 50 U.S.P.Q. 2d 1614, 1617 (Fed. Cir. 1999) the Federal Circuit stated:

> Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.

Consistently, in *In re Rouffet,* 149 F.3d 1350, 1359, 47 U.S.P.Q. 2d 1453, 1459 (Fed. Cir. 1998), the Federal Circuit stated:

> [E]ven when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill in the art, that suggests the claimed combination. In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.

In *Winner International Royalty Corp. v. Wang,* 200 F.3d 1340, 1348-1349, 53 U.S.P.Q. 2d 1580, 1586 (Fed. Cir. 2000), the Federal Circuit stated:

> Although a reference need not expressly teach that the disclosure contained therein should be combined with another, ... the showing of combinability, in whatever form, must nevertheless be clear and particular.

Lastly, in *Crown Operations International, Ltd. v. Solutia, Inc.,* 289 F.3d 1367, 1376, 62 U.S.P.Q. 2d 1917 (Fed. Cir. 2002), the Federal Circuit stated:

> There must be a teaching or suggestion within the prior art, within the nature of the problem to be solved, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources, to select particular elements, and to combine them as combined by the inventor.

Appellants submit that the decision of the United States Supreme Court in *KSR International Co. v. Teleflex Inc.,* _____U.S. _____, 127 S.Ct. 1727, 82 USPQ 2d 1385 (2007), and the United States Patent and Trademark Office guidelines for applying that decision, support the position of the Appellants. That decision, although stating that it is not always required to point to a specific teaching in a prior art reference in order to substantiate a rejection under 35 U.S.C. §103(a), by no means approved ignoring the above long-standing precedent, and certainly did not represent a blanket overruling of that precedent. In the *KSR* decision, the Supreme Court stated, *under certain circumstances*, it may not be necessary to point to a specific passage in a prior art reference as evidence of motivation, guidance or inducement in order to modify that reference in a manner that obviates the patent claim in question. The Supreme Court stated that if a person of ordinary skill in the art can implement a *predictable variation* and would see the benefit of doing so, Section 103(a) likely bars patentability.

Nevertheless, the Supreme Court also stated that the requirement to find a teaching, suggestion or motivation in the prior art "captures a helpful insight." The

Supreme Court stated that although common sense directs caution as to a patent application claiming as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the art to combine the elements as the new invention does. The Supreme Court, however, stated that not every application requires such detailed reasoning. The Supreme Court stated that helpful insights need not become rigid and mandatory formulas. The Supreme Court only stated that if the requirement to find a teaching, suggestion or motivation is required in such a rigid, formulaic manner, it is then inconsistent with the precedence of the Supreme Court. In fact, the Supreme Court stated that since the "teaching, suggestion or motivation" test was devised, the Federal Circuit doubtless has applied it in accord with these principles in many cases. The Supreme Court stated there is no necessary inconsistency between this test and an analysis conducted under the standards of *Graham v. Deere.* The Supreme Court stated the only error is transforming this general principle into a "rigid rule limiting the obviousness inquiry."

Therefore, Appellants submit this decision of the Supreme Court does not in any manner approve, much less require, the absence of a rigorous evidentiary investigation on the part of the Examiner in order to substantiate most rejections under 35 U.S.C. §103(a). Only under the somewhat unusual, and very limited, circumstances outlined by the Supreme Court in the *KSR* decision might the Supreme Court excuse the absence of such a rigorous evidentiary investigation in reaching a conclusion of obviousness under 35 U.S.C. §103(a).

This view of the *KSR* decision has been substantiated by the United States Court of Appeals for the Federal Circuit in *Takeda Chemical Industries Limited v.*

Alphapharm Pty.Ltd.,492 F.3d 1350, 83 U.S.P.Q.2d, 169 (Fed. Cir. 2007), which was one of the earliest decisions of the Federal Circuit after the *KSR* decision was decided by the Supreme Court. The *Takeda* decision concerned a chemical patent that was the subject of an infringement lawsuit, and which was attacked by the infringer on the basis of the claimed subject matter being "obvious to try." After acknowledging that the *KSR* decision held that the teaching-suggestion-motivation test should not be applied rigidly, the Federal Circuit stated that the *KSR* decision actually recognized the value of that test in determining whether the prior art provided a *reason* for one of skill in the art to make the claimed combination. The Federal Circuit stated this is consistent with the Federal Circuit precedent in *In re Dillon,* 919 F.2d 688 (Fed. Cir. 1990) and in *In re Deuel*, 51 F.3d 1552 (Fed. Cir. 1995). The Federal Circuit stated that in cases involving new chemical compounds, it remains necessary to identify some reason that would have led a chemist to modify a known compound in a particular manner to establish *prima facie* obviousness of the new claimed compound. In the *Takeda* decision, the Federal Circuit stated:

> The *KSR* Court recognized that "[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp," *KSR*, 127 S.Ct. at 1732. In such circumstances, "the fact that a combination was obvious to try might show that it would obvious under §103." *id.* that is not the case here. Rather than identify predictable solutions for antidiabetic treatment, the prior art disclosed a broad selection of compounds, any one of which could have been selected as a lead compound for further investigation.

In response to the above arguments that were made during earlier prosecution, the Examiner stated, in the Final Rejection, that it must be recognized that any judgment as to obviousness is in a sense necessarily a reconstruction

based on hindsight reasoning, but as long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Appellant's disclosure, such a reconstruction is proper. Appellant does not disagree that this is an accurate general statement of the law relating to obviousness, but respectfully submit that it is not applicable to the present situation, wherein one of the references itself (USPS Minutes), that is explicitly relied upon by the Examiner, is overwhelming evidence of the long standing but unsolved need that exists in this particular field for a way to enter product codes into a franking imprint, and the fact that the Examiner has additionally relied on a reference that was written even before the USPS Minutes, which therefore can have no relevancy whatsoever to product codes, since they did not even exist at the time that reference was written.

The Examiner has further stated that the claimed subject matter represents only a substitution of the product codes taught in USPS Minutes for the codes disclosed in Guenther et al. as applied to Uno et al. Since nothing in any of the references of record, however, provides any suggestion whatsoever as to how product codes can or should be actually entered into a physical device (as opposed to requiring their inclusion in the franking imprint), Appellant submits that the Examiner's position begs the question of obviousness, because it already *assumes* that the aforementioned substitution should be made. Appellant respectfully submits that in order to properly substantiate an obviousness rejection, there must be a guiding teaching in at least one reference to enter product codes in some manner other than by manual entry. In the absence of such a teaching in any of the references of record, Appellant respectfully submits that the Examiner has, in fact,

learned of the insight of making such a "substitution" only from Appellant's specification.

Appellant therefor respectfully submits that none of claims 1-10, 12 or 14 would have been obvious to a person of ordinary skill in the field of designing mail-processing devices, under the provisions of 35 U.S.C. §103(a), based on the teachings of Uno et al., Guenther et al. and USPS Minutes.

Rejection of Claims 11-13 Under 35 U.S.C. §103(a) Based on Uno et al., Guenther et al., USPS Minutes, and Official Notice

In substantiating the rejection of claims 11 and 13, the Examiner took Official Notice of the admitted prior art that it is known for drive devices to receive data from CDs and DVDs, employed as storage data carriers. Claims 11 and 13 embody the subject matter of independent claim 1 therein, and therefore Appellant submits that the above arguments with regard to the deficiencies of the Uno et al./Guenther et al./USPS Minutes combination with regard to claim 1 are equally applicable with regard to the rejection of claims 11-13. Even if that combination were further modified in view of the Official Notice teaching, the subject matter of claims 11 and 13 still would not result, for the above reasons.

Neither of claims 11 or 13, therefore, would have been obvious to a person of ordinary skill in the field of designing mail-processing devices, under the provisions of 35 U.S.C. §103(a), based on the teachings of Uno et al., Guenther et al., USPS Minutes, and the Official Notice teachings.

CONCLUSION:

For the foregoing reasons, Appellant respectfully submits that all claims of the application are patentable over the teachings of the references relied upon by the

Examiner. Reversal of the above rejections is therefore proper, and the same is respectfully requested.

This Appeal Brief is accompanied by electronic payment for the requisite fee in the amount of $510.00.

The Commissioner is hereby authorized to charge any additional fees which may be required, or to credit any overpayment to account No. 501519.

Submitted by,

/STEVEN H. NOLL/ (Reg. 28,982)
SCHIFF, HARDIN LLP
CUSTOMER NO. 26574
Patent Department
6600 Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606
Telephone: 312/258-5790
Attorneys for Appellant.

CLAIMS APPENDIX

1. A mail-processing device comprising:

a programmable memory having a table stored therein containing a plurality of product codes;

a program memory containing an operating program to generate print data for a franking imprint to be printed on a mail item;

a working memory having mail-item-related data values stored therein;

a keyboard having a plurality of operating elements allowing manual entry of said mail-item-related data values for said mail item into said working memory;

a microprocessor in communication with said programmable memory, said program memory, said program memory, said working memory, and said keyboard;

said programmable memory, said working memory and said microprocessor, in combination, being programmable by said operating program to set an operating mode for automatic product code entry; and

said microprocessor being programmed in said operating mode to evaluate said mail-item-related data values stored in said working memory and to automatically select an applicable product code from among said plurality of product codes stored in said table stored in said programmable memory, and to generate print data for a franking imprint for said mail item that includes said applicable product code.

2. A mail-processing device as claimed in claim 1 wherein said table in said programmable memory comprises a plurality of columns, each of said columns comprising a plurality of rows, and including first and second columns containing datasets representing defaults for valid shipping parameters, and wherein said microprocessor is programmed for row-by-row searching through said first and second columns to identify datasets in said first and second columns corresponding to said values stored in said working memory and, for the valid shipping parameters represented by said datasets, said microprocessor evaluating structures in remaining columns of said table.

3. A mail-processing device as claimed in claim 2 comprising a display device connected to said microprocessor and wherein said microprocessor is supplied with a weight selected from the group consisting of an entered weight and a measured weight, and wherein said table is a first table stored in a first memory range of said programmable memory, said programmable memory having further memory ranges in which further tables are respectively stored, including a weight table for determining a table index assigned to different weights, and a product code table for determining a product code assigned to said table index, and wherein said microprocessor is programmed for storing a start address of said first table in said programmable memory, for generating a screen image for shipping parameters associated with said values stored in said working memory and for displaying said screen images on said display device, and for accessing said tables in said programmable memory for evaluating data values in a row of said first table in said programmable memory, said data values corresponding to the values stored in said working memory and designating, by a pointer to said product code table,

designated product codes, and said microprocessor being programmed for storing the product codes designated by the pointer with the table index for said weight.

4. A mail-processing device as claimed in claim 2 comprising a display device connected to said microprocessor and wherein said microprocessor is supplied with a weight selected from the group consisting of an entered weight and a measured weight, and wherein said table is a first table stored in a first memory range of said programmable memory, said programmable memory having further memory ranges in which further tables are respectively stored, including a weight class table for determining a table index assigned to a weight class code stored in a further memory, and a product code table for determining a product code assigned to said table index, and wherein said microprocessor is programmed for storing a start address of said first table in said programmable memory, for generating a screen image for shipping parameters associated with said values stored in said working memory and for displaying said screen images on said display device, and for accessing said tables in said programmable memory for evaluating data values in a row of a table in said programmable memory, said data values corresponding to the values stored in said working memory and designating, by a pointer to said product code table, designated product codes, and said microprocessor being programmed for storing the product codes designated by the pointer with the table index for a weight class in which said weight occurs.

5. A mail-processing device as claimed in claim 4 comprising a receiver unit for loading and storing table values and data for entry into at least one of said table, said weight table, said product code table and said weight class table.

6. A mail-processing device as claimed in claim 4 for use with a postage meter machine, and comprising an interface adapted for connection to the postage meter machine, and wherein said working memory temporarily stores at least one of said weight class code and said product code in respective memory areas, and wherein said microprocessor is programmed to transmit at least one of said weight class code and said product code to the postage meter machine via said interface.

7. A mail-processing device as claimed in claim 1 comprising an interface in communication with said microprocessor for setting said operating mode.

8. A mail-processing device as claimed in claim 1 wherein one of said operating elements of said keyboard, when actuated, sets said operating mode.

9. An apparatus as claimed in claim 1 comprising a receiving unit connected to said programmable memory for loading said table.

10. A mail-processing device as claimed in claim 9 wherein said receiver unit is a modem selected from the group consisting of analog modems and digital modems.

11. A mail-processing device as claimed in claim 9 wherein said receiving unit is a drive device adapted to receive a data carrier on which said table is stored, selected from the group consisting of CDs and DVDs.

12. A mail-processing device as claimed in claim 9 wherein said receiving unit is a chip card reader adapted to receive a chip card having a memory in which said table is stored.

13. A mail-processing device as claimed in claim 9 wherein said receiving unit is a memory stick interface adapted to receive a memory stick having a memory in which said table is stored.

14. A computer-readable medium encoded with a data structure for a mail-processing device having a programmable memory, a working memory and a microprocessor programmed to operate in an operating mode for automatic product code entry, and having a receiver unit in communication with the microprocessor, said data structure comprising a plurality of memory areas in which are stored, respectively, an application program for said automatic product code entry and for generating screen images for shipping parameters on a display device, at least one first table in one of said memory areas and respective further tables in further memory areas to which access is enabled by said application program, said first table comprising columns of data values for valid shipping parameters and pointers to a weight table, pointers to a product code table and pointers to a weight class table, all of said tables being loadable from said computer-readable medium into said programmable memory via said receiver unit.

EVIDENCE APPENDIX

Exhibit A: Figures 1 and 2 - Filed with the original application on March 10, 2004.

Exhibit B: United States Patent No. 5,535,127 (Uno et al.) - Cited in the March 17, 2008 Office Action

Exhibit C: United States Patent No. 5,852,813 (Guenther et al.) - Cited in the March 17, 2008 Office Action

Exhibit D: U.S. Postal Service Minutes of the Mailers' Technical Advisory Committee, December 10-11, 1997 - Cited in the March 17, 2008 Office Action

RELATED PROCEEDINGS APPENDIX

None.

CH1\5919777.1

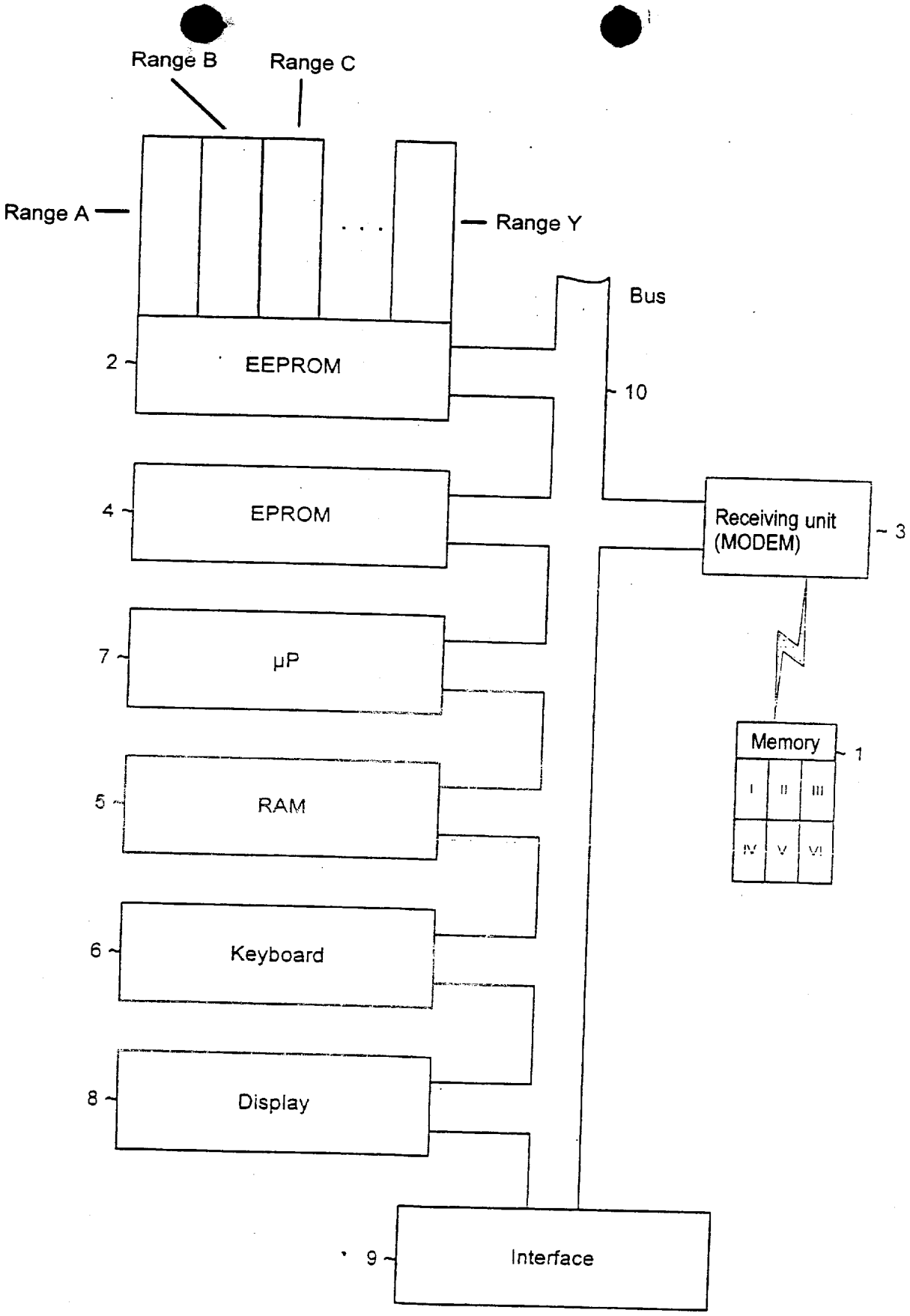


Figure 1

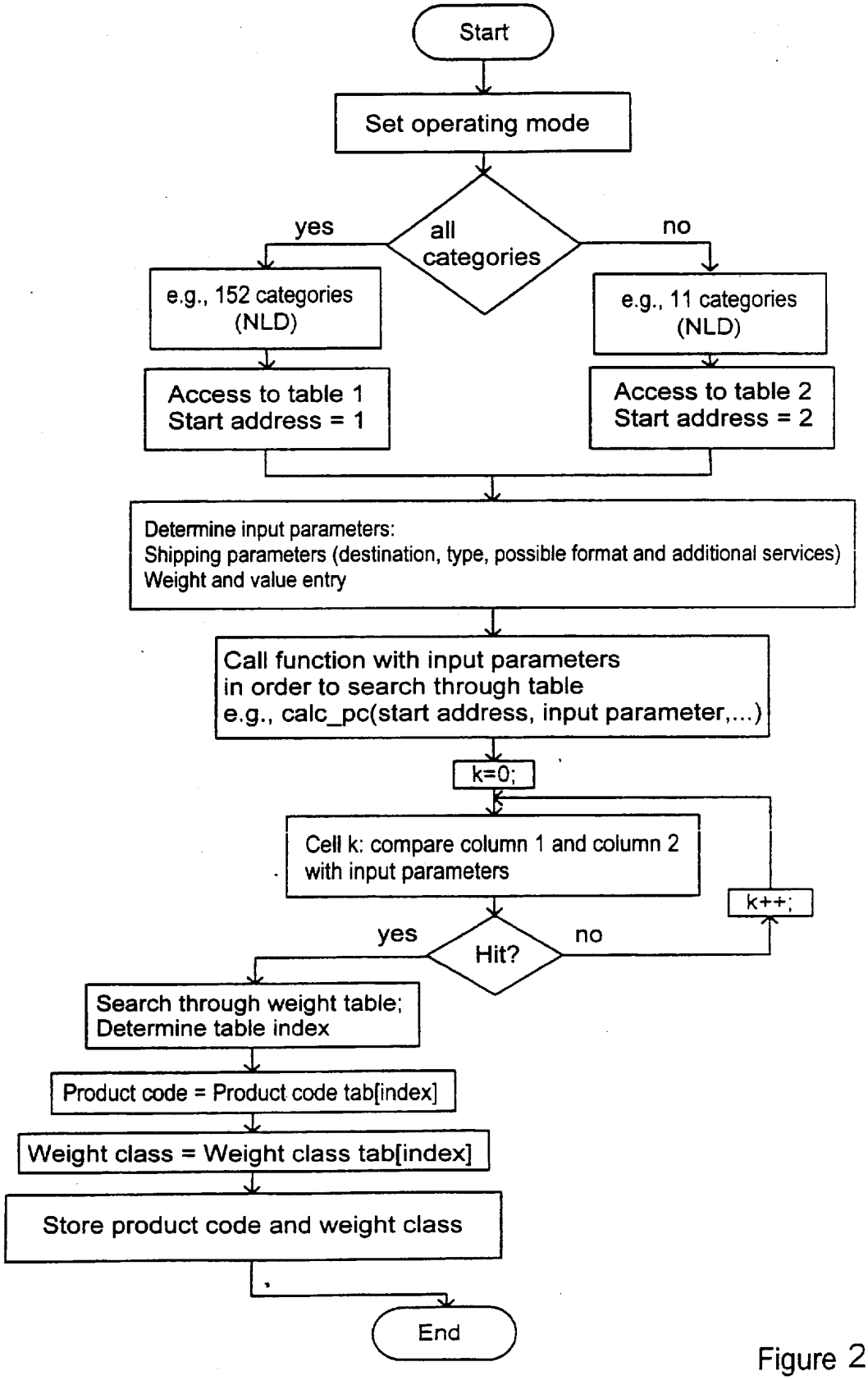

Start
Set operating mode
all categories
yes
no
e.g., 152 categories (NLD)
e.g., 11 categories (NLD)
Access to table 1 Start address = 1
Access to table 2 Start address = 2
Determine input parameters:
Shipping parameters (destination, type, possible format and additional services)
Weight and value entry
Call function with input parameters in order to search through table
e.g., calc_pc(start address, input parameter,...)
k=0;
Cell k: compare column 1 and column 2 with input parameters
k++;
Hit?
yes
no
Search through weight table; Determine table index
Product code = Product code tab[index]
Weight class = Weight class tab[index]
Store product code and weight class
End

Figure 2

US005535127A

United States Patent [19]

Uno et al.

[11] Patent Number: 5,535,127

[45] Date of Patent: Jul. 9, 1996

[54] **PROCESSING APPARATUS FOR MAIL WITH STAMPS**

[75] Inventors: **Teruhiko Uno**, Tokyo; **Toshio Hirasawa**, Kawasaki; **Toshio Sato**; **Kazuyo Nakagawa**, both of Yokohama; **Hiroshi Takahashi**, Okegawa, all of Japan

[73] Assignee: **Kabushiki Kaisha Toshiba**, Kawasaki, Japan

[21] Appl. No.: **275,420**

[22] Filed: **Jul. 15, 1994**

[30] **Foreign Application Priority Data**

Jul. 16, 1993 [JP] Japan 5-197744

[51] **Int. Cl.**[6] **G07B 17/00**

[52] **U.S. Cl.** **364/464.02**; 356/383; 356/384; 356/385; 364/464.03; 382/101

[58] **Field of Search** 356/379, 381, 356/383, 384, 385; 364/464.02, 464.03; 382/101

[56] **References Cited**

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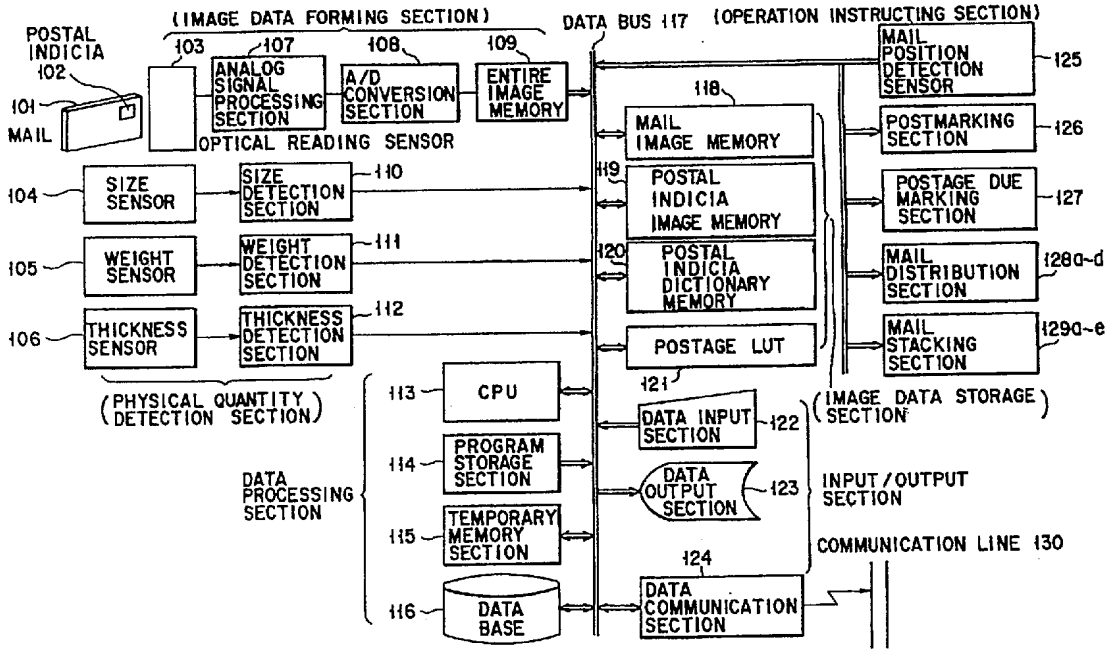
212021 1/1990 Japan .

Primary Examiner—Edward R. Cosimano
Attorney, Agent, or Firm—Cushman Darby & Cushman

[57] **ABSTRACT**

An automatic mail processing apparatus comprises a physical quantity detection section for detecting physical quantities of mail with a stamp, such as the weight and dimensions of the mail, a postage determining section for determining the valid postage for the mail with reference to a table in which valid charges are previously stored on the basis of the information items indicating physical quantities, and a stamp detection section for detecting the amount paid on the basis of the information on the stamp contained in the image of the mail, and a processing section for verifying the determined postage with the amount paid to detect a surplus or deficit of the amount paid, and to identify the kind of the mail, classify the mail, and compile statistics data on the mail.

11 Claims, 35 Drawing Sheets



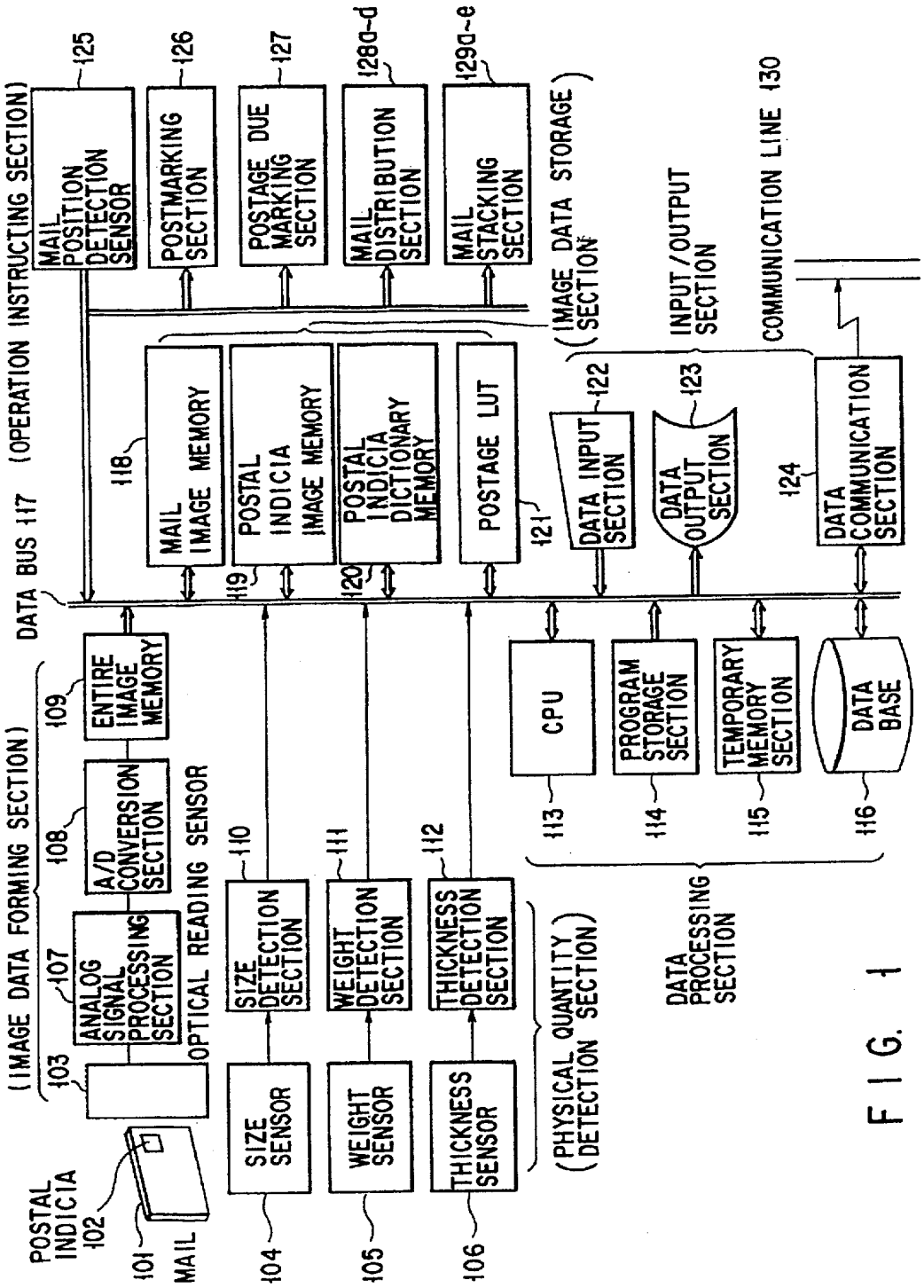
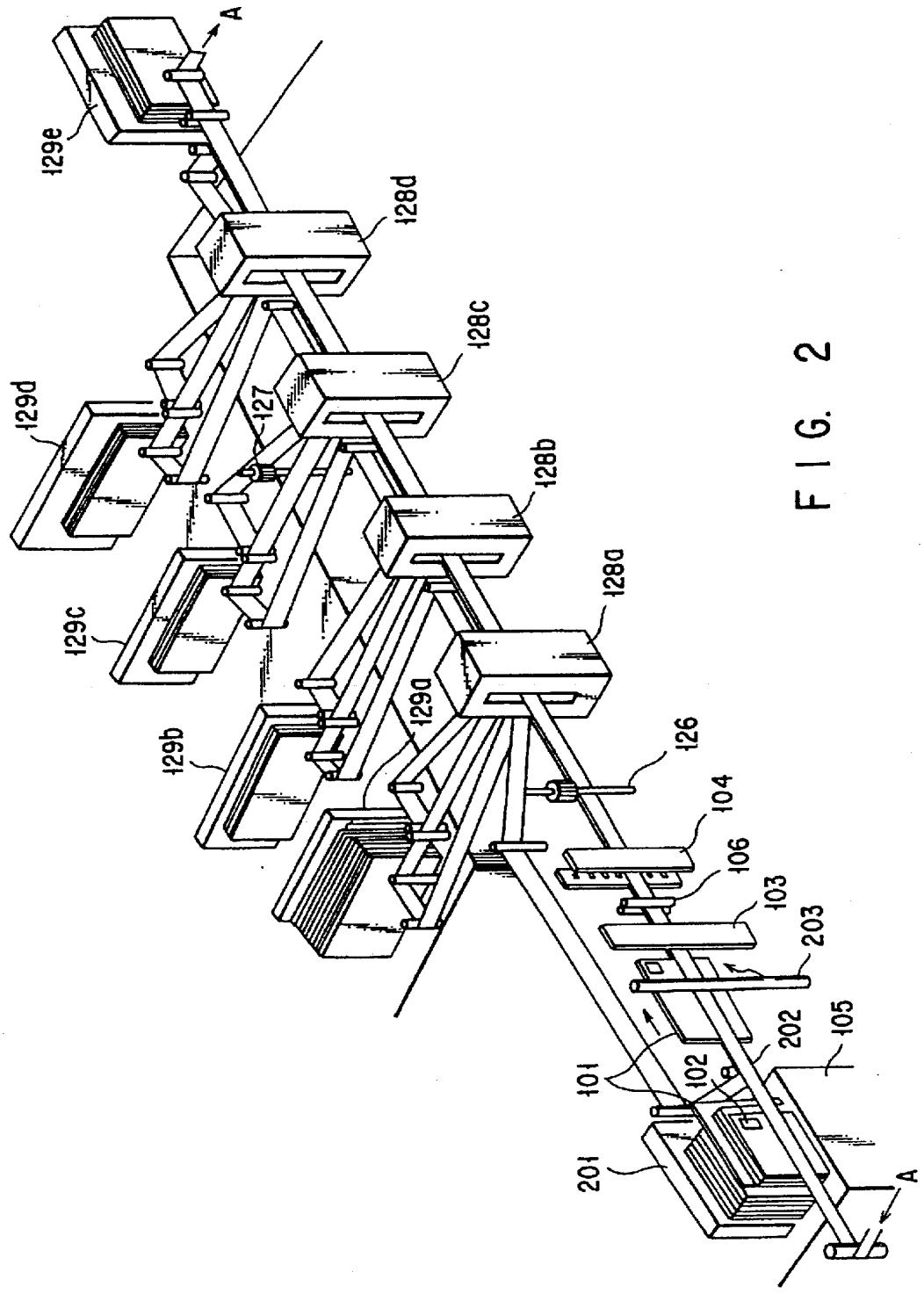

(IMAGE DATA FORMING SECTION)
(OPERATION INSTRUCTING SECTION)
DATA BUS 117
MAIL POSITION DETECTION SENSOR 125
POSTMARKING SECTION 126
POSTAGE DUE MARKING SECTION 127
MAIL DISTRIBUTION SECTION 128a-d
MAIL STACKING SECTION 129a-e
(IMAGE DATA STORAGE SECTION)
INPUT/OUTPUT SECTION
COMMUNICATION LINE 130
MAIL IMAGE MEMORY 118
POSTAL INDICIA IMAGE MEMORY 119
POSTAL INDICIA DICTIONARY MEMORY 120
POSTAGE LUT 121
DATA INPUT SECTION 122
DATA OUTPUT SECTION 123
DATA COMMUNICATION SECTION 124
ENTIRE IMAGE MEMORY 109
A/D CONVERSION SECTION 108
ANALOG SIGNAL PROCESSING SECTION 107
OPTICAL READING SENSOR 103
SIZE DETECTION SECTION 110
WEIGHT DETECTION SECTION 111
THICKNESS DETECTION SECTION 112
CPU 113
PROGRAM STORAGE SECTION 114
TEMPORARY MEMORY SECTION 115
DATA BASE 116
DATA PROCESSING SECTION
(PHYSICAL QUANTITY DETECTION SECTION)
SIZE SENSOR 104
WEIGHT SENSOR 105
THICKNESS SENSOR 106
MAIL 101
POSTAL INDICIA 102

FIG. 1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129e
128d
128c
129d
127
128b
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129c
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126
104
106
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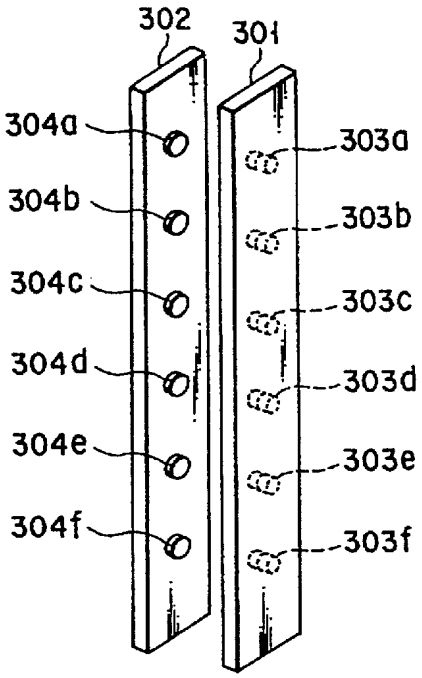
105
101
102
201
A

FIG. 2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303e
303f

FIG. 3

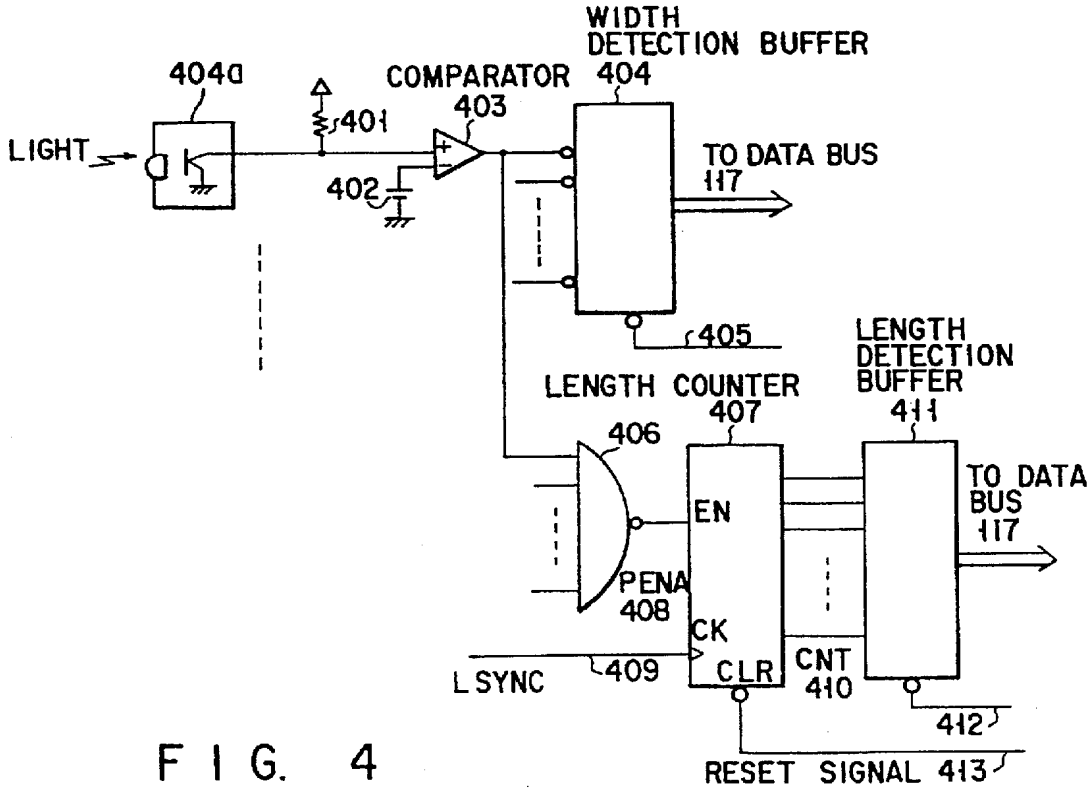

WIDTH
DETECTION BUFFER
404
404a
COMPARATOR
403
401
LIGHT
402
TO DATA BUS
117
405
LENGTH
DETECTION
BUFFER
411
LENGTH COUNTER
407
406
EN
PENA
408
CK
CLR
CNT
410
TO DATA
BUS
117
L SYNC
409
412
RESET SIGNAL 413

FIG. 4

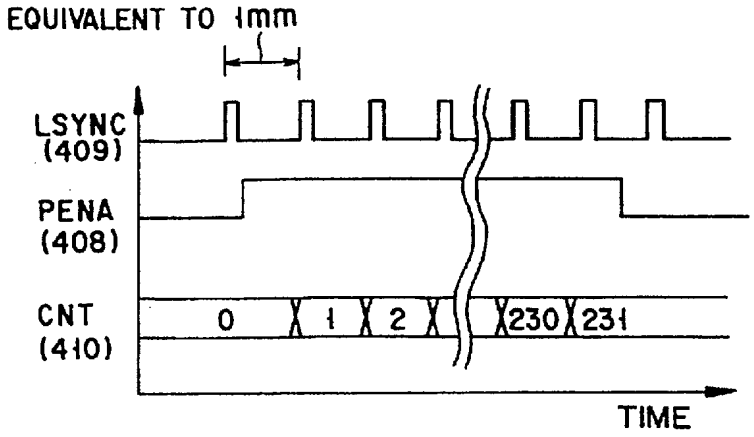


FIG. 5

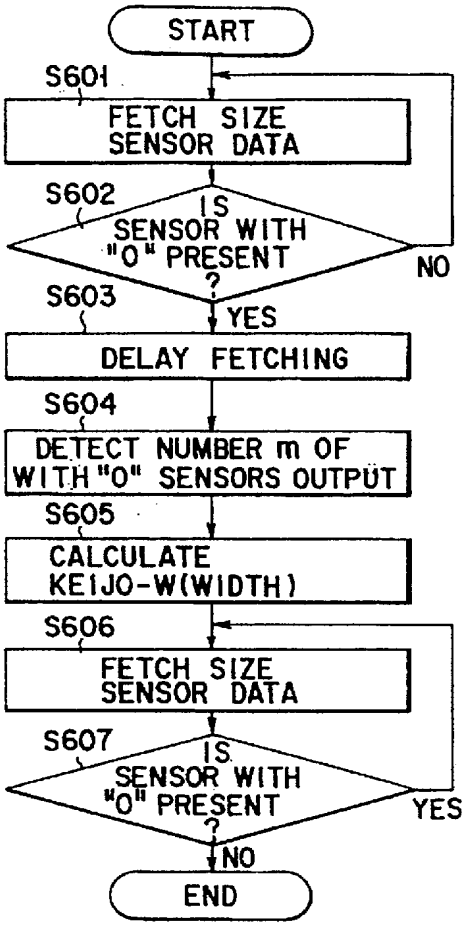


FIG. 6

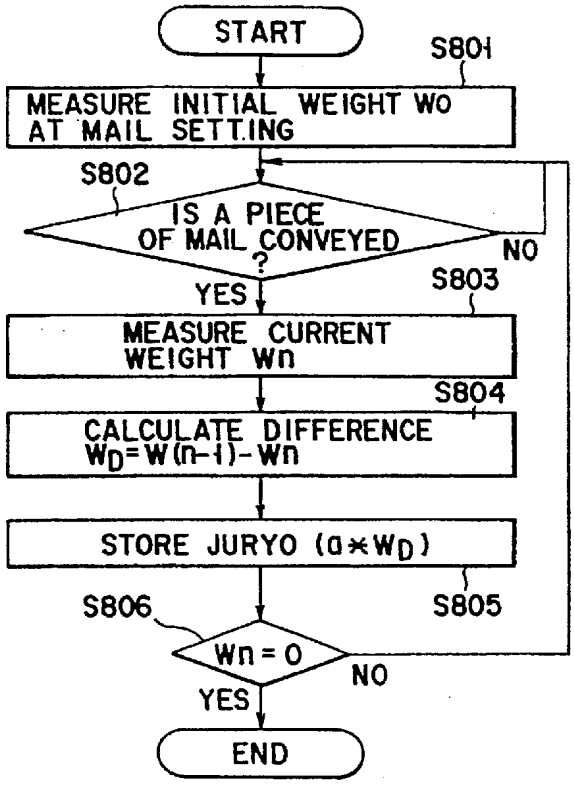
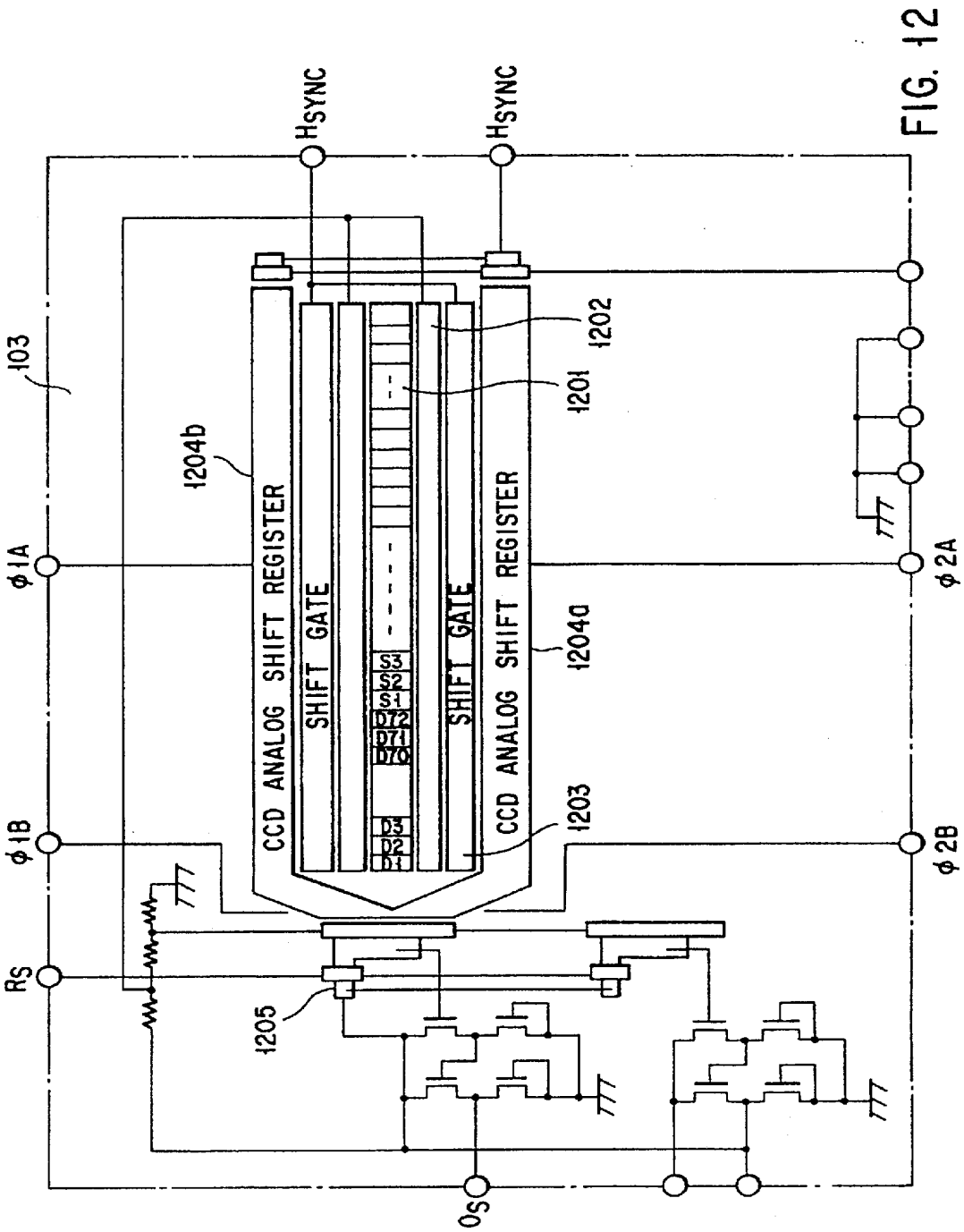


FIG. 8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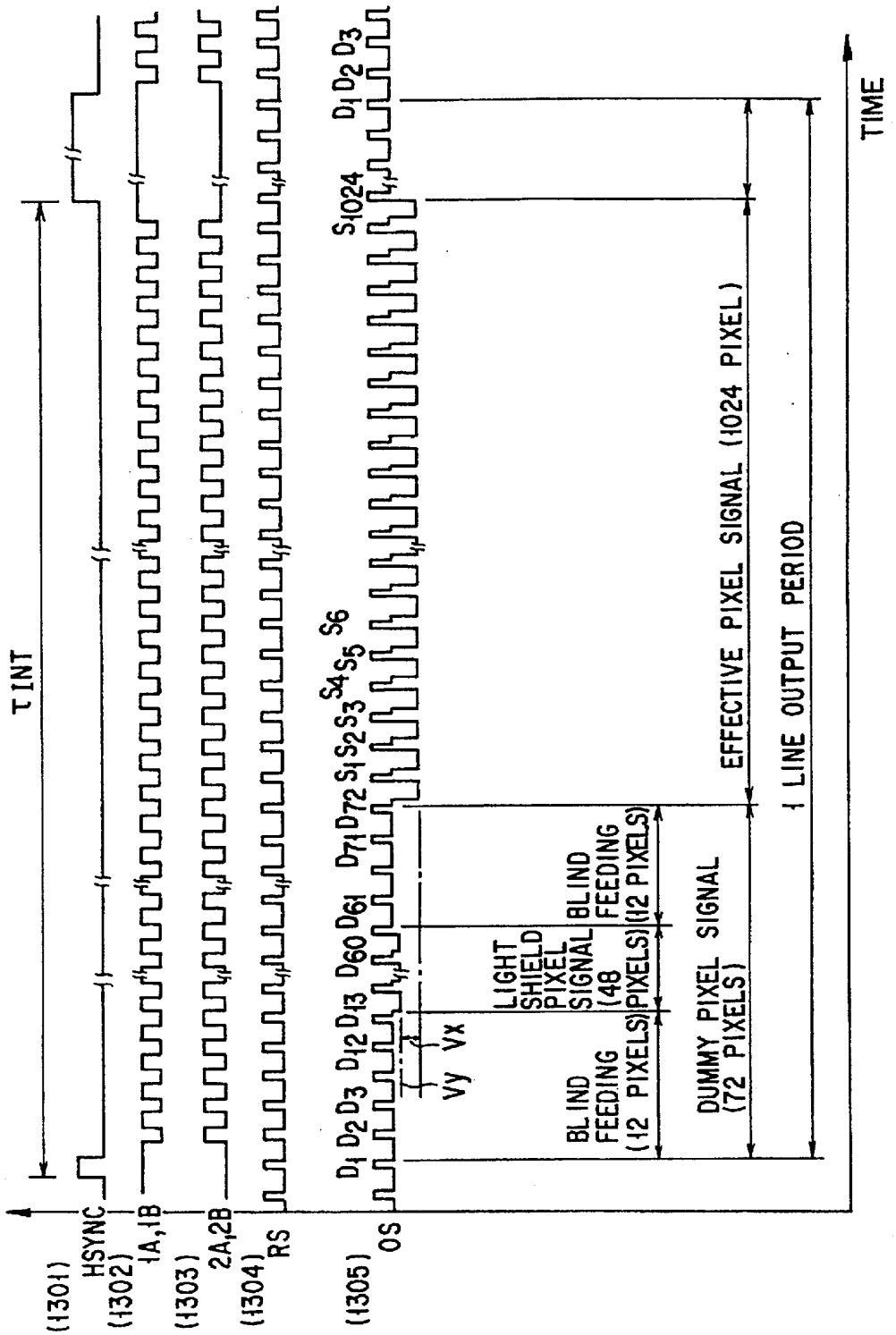
HSYNC
103
1204b
1202
1201
φ1A
φ2A
CCD ANALOG SHIFT REGISTER
SHIFT GATE
SHIFT GATE
CCD ANALOG SHIFT REGISTER
1204a
S3
S2
S1
D72
D71
D70
D3
D2
D1
1203
φ1B
φ2B
RS
1205
OS

FIG. 12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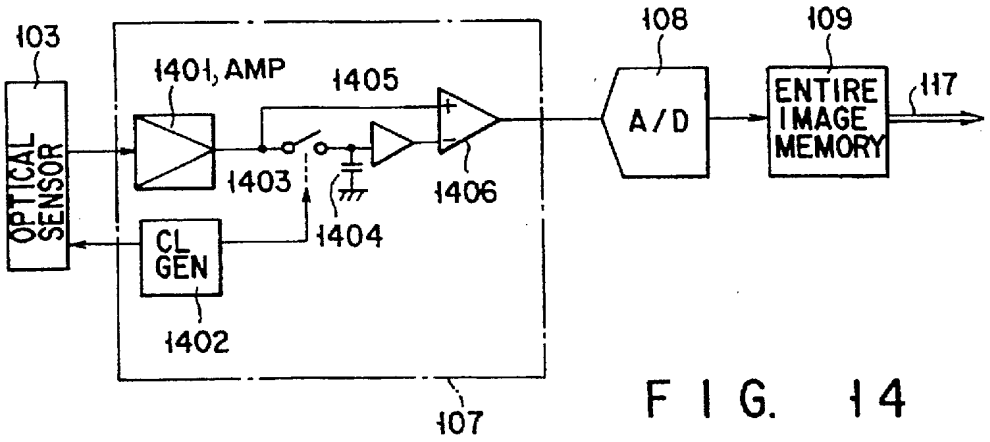
HSYNC
(1302)
1A,1B
(1303)
2A,2B
(1304)
RS
(1305)
OS
D1 D2 D3 D12 D13 D60 D61 D71 D72 S1 S2 S3 S4 S5 S6
S1024 D1 D2 D3
Vy Vx
LIGHT SHIELD PIXEL SIGNAL (48 PIXELS)
BLIND FEEDING (12 PIXELS)
BLIND FEEDING (12 PIXELS)
DUMMY PIXEL SIGNAL (72 PIXELS)
EFFECTIVE PIXEL SIGNAL (1024 PIXEL)
1 LINE OUTPUT PERIOD
TIME

FIG. 13


103
OPTICAL SENSOR
1401, AMP
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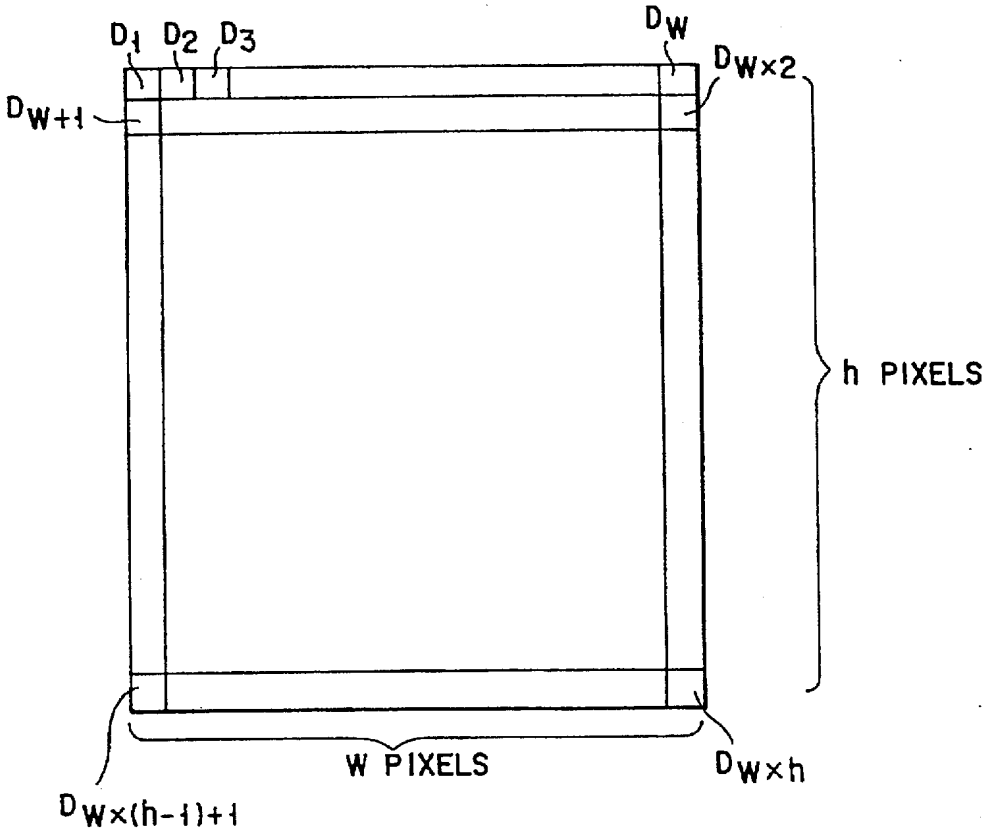
1403
1404
1406
CL GEN
1402
107
108
A/D
109
ENTIRE IMAGE MEMORY
117

FIG. 14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DW×2
DW+1
h PIXELS
W PIXELS
DW×(h-1)+1
DW×h

FIG. 15

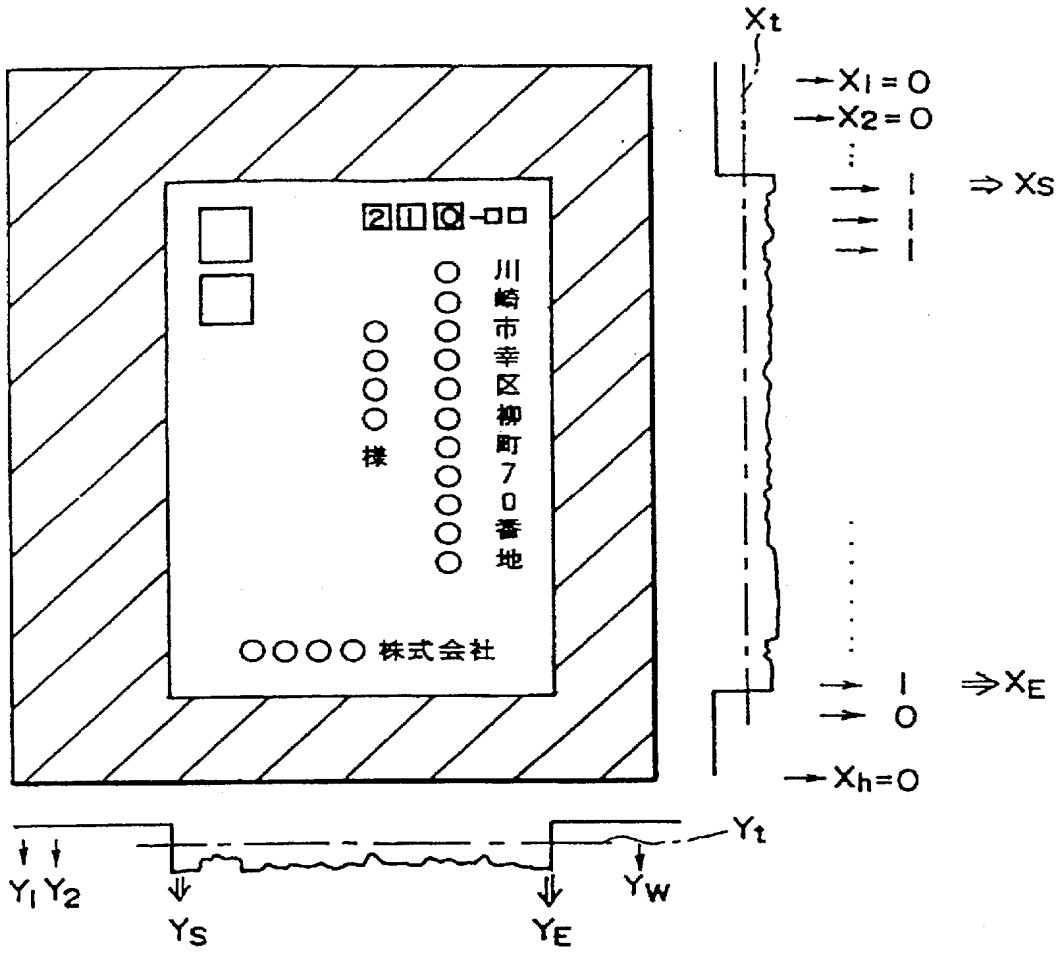


FIG. 16

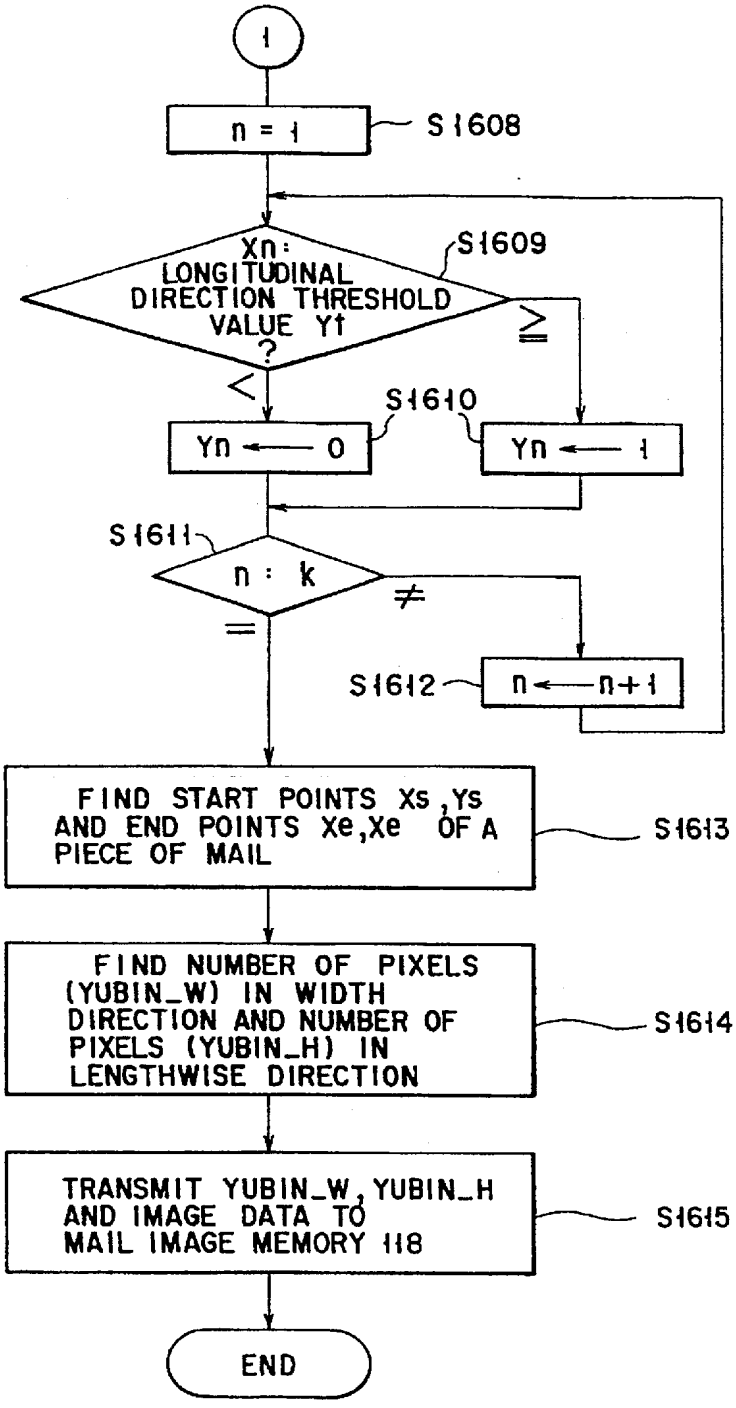

1
n = 1
S1608
Xn: LONGITUDINAL DIRECTION THRESHOLD VALUE Yt ?
S1609
≧
<
S1610
Yn ← 0
Yn ← 1
S1611
n : k
≠
=
S1612
n ← n+1
FIND START POINTS Xs, Ys AND END POINTS Xe, Xe OF A PIECE OF MAIL
S1613
FIND NUMBER OF PIXELS (YUBIN_W) IN WIDTH DIRECTION AND NUMBER OF PIXELS (YUBIN_H) IN LENGTHWISE DIRECTION
S1614
TRANSMIT YUBIN_W, YUBIN_H AND IMAGE DATA TO MAIL IMAGE MEMORY 118
S1615
END

FIG. 18

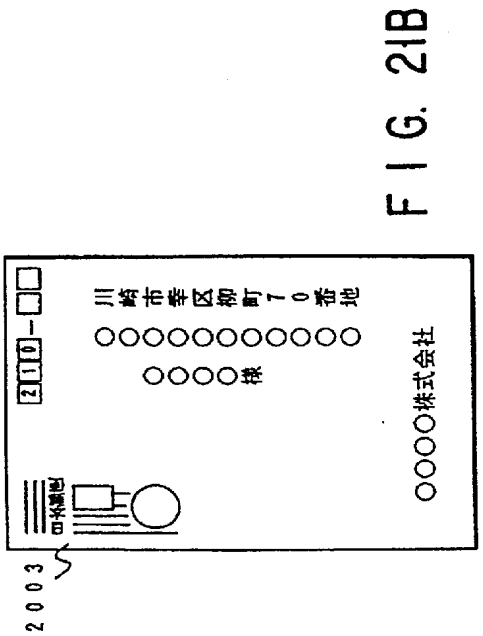


FIG. 21A

FIG. 21B

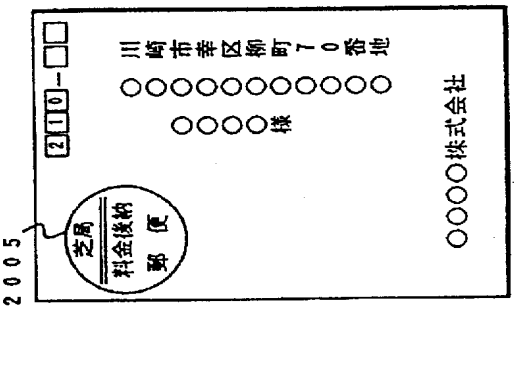


FIG. 21C

FIG. 21D

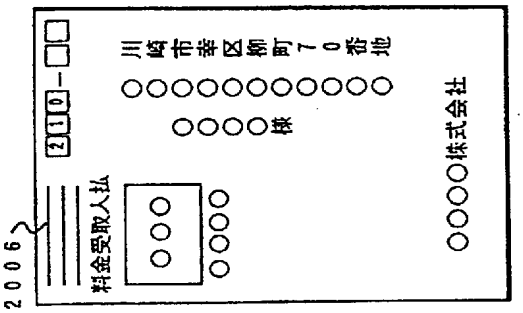


FIG. 21E

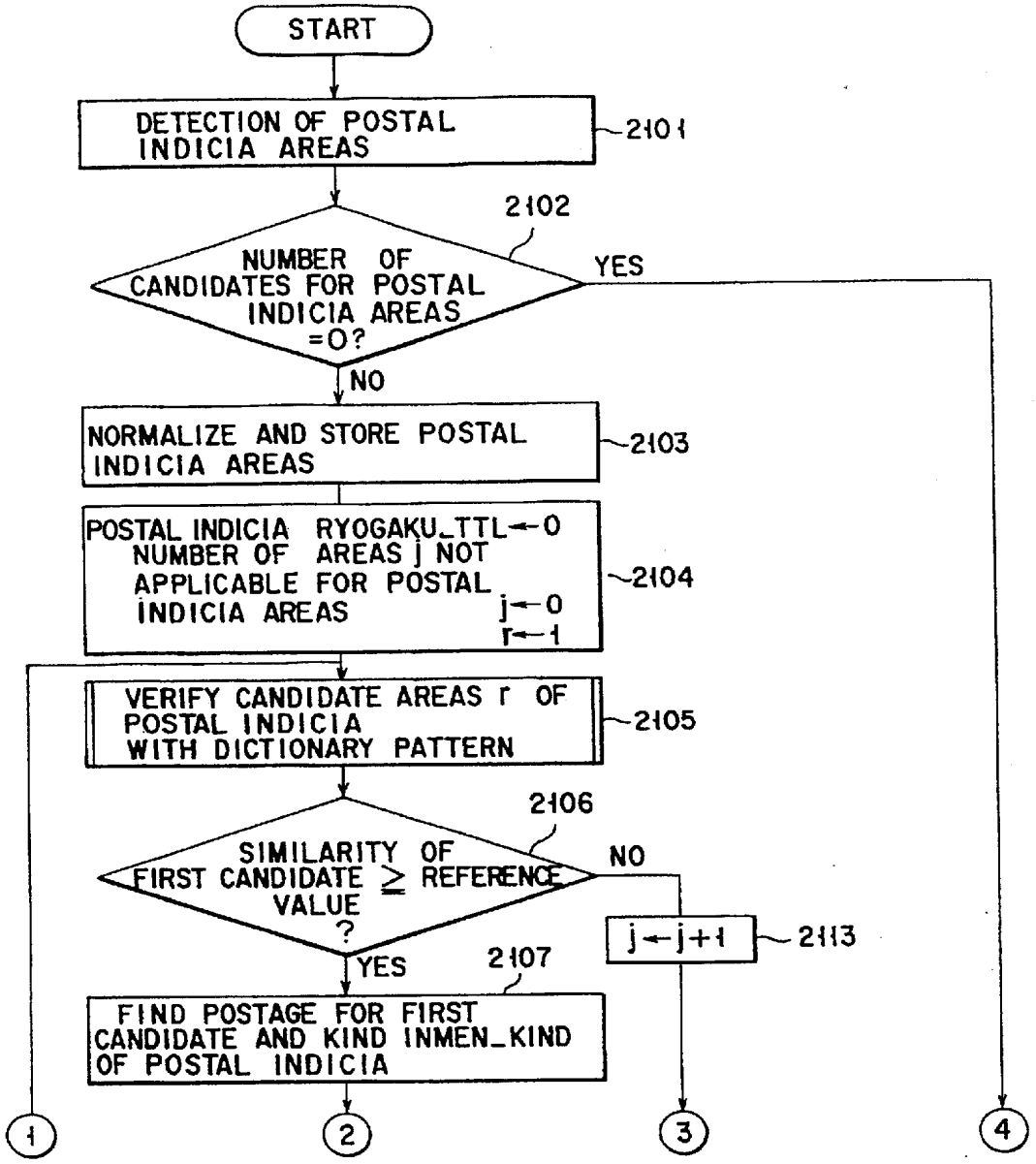

START
DETECTION OF POSTAL INDICIA AREAS
2101
2102
NUMBER OF CANDIDATES FOR POSTAL INDICIA AREAS =0?
YES
NO
NORMALIZE AND STORE POSTAL INDICIA AREAS
2103
POSTAL INDICIA NUMBER OF AREAS j NOT APPLICABLE FOR POSTAL INDICIA AREAS
RYOGAKU_TTL←0
j←0
r←1
2104
VERIFY CANDIDATE AREAS r OF POSTAL INDICIA WITH DICTIONARY PATTERN
2105
2106
SIMILARITY OF FIRST CANDIDATE ≥ REFERENCE VALUE ?
NO
YES
j←j+1
2113
2107
FIND POSTAGE FOR FIRST CANDIDATE AND KIND INMEN_KIND OF POSTAL INDICIA
1
2
3
4

FIG. 22

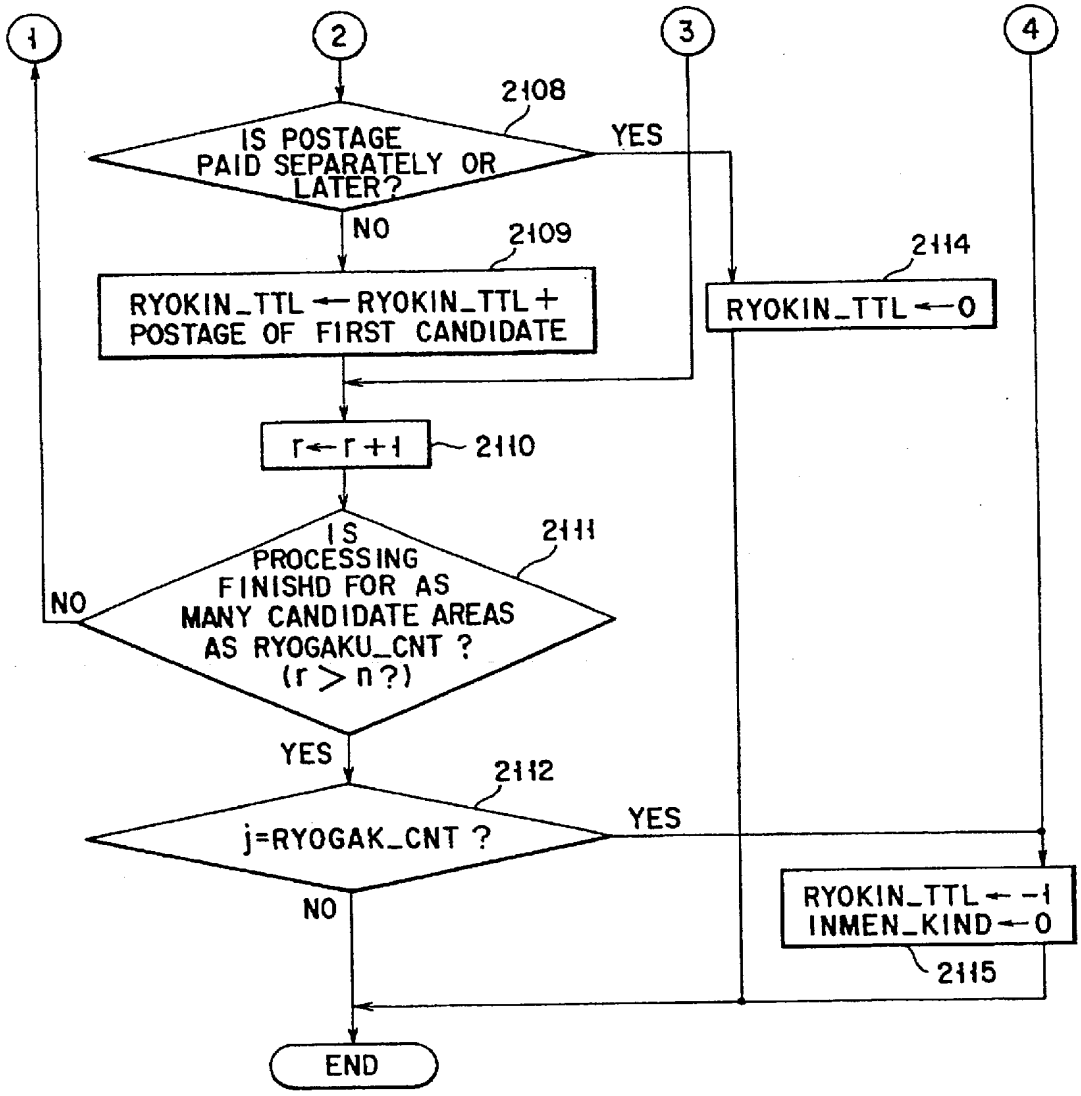

1
2
3
4
2108
IS POSTAGE PAID SEPARATELY OR LATER?
YES
NO
2109
RYOKIN_TTL ← RYOKIN_TTL + POSTAGE OF FIRST CANDIDATE
2114
RYOKIN_TTL ← 0
r ← r + 1
2110
2111
IS PROCESSING FINISHD FOR AS MANY CANDIDATE AREAS AS RYOGAKU_CNT ? (r > n ?)
NO
YES
2112
j=RYOGAK_CNT ?
YES
NO
RYOKIN_TTL ← -1
INMEN_KIND ← 0
2115
END

FIG. 23

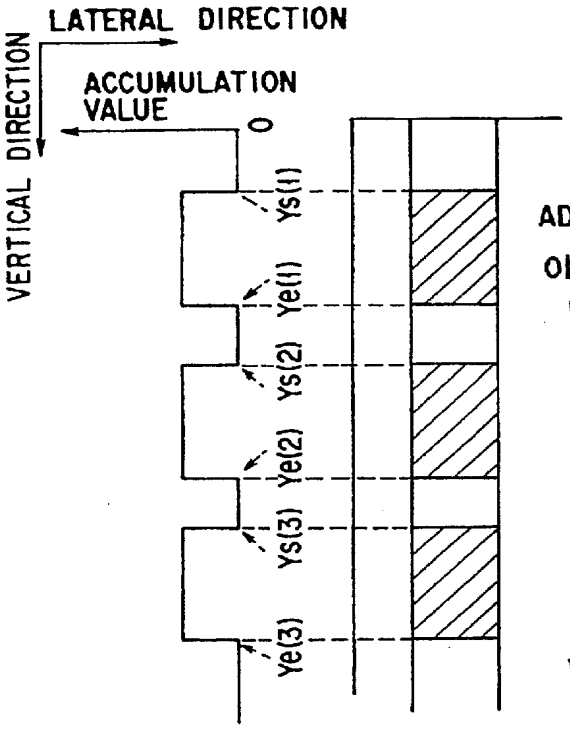


FIG. 28

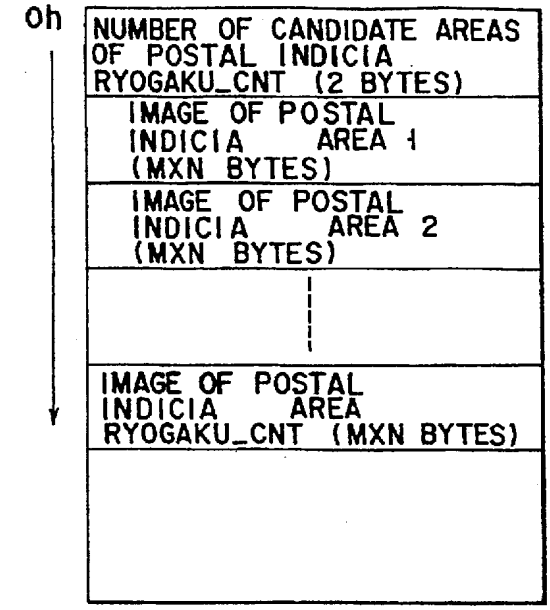


FIG. 30

FIG. 29
(a)

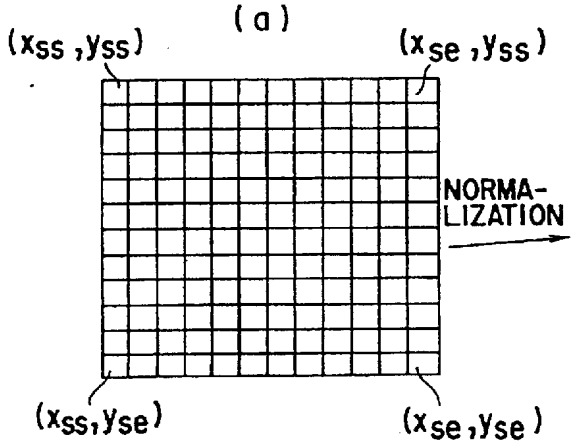
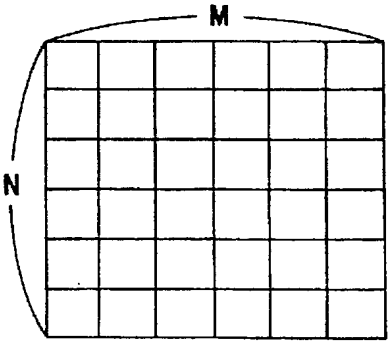


FIG. 29
(b)



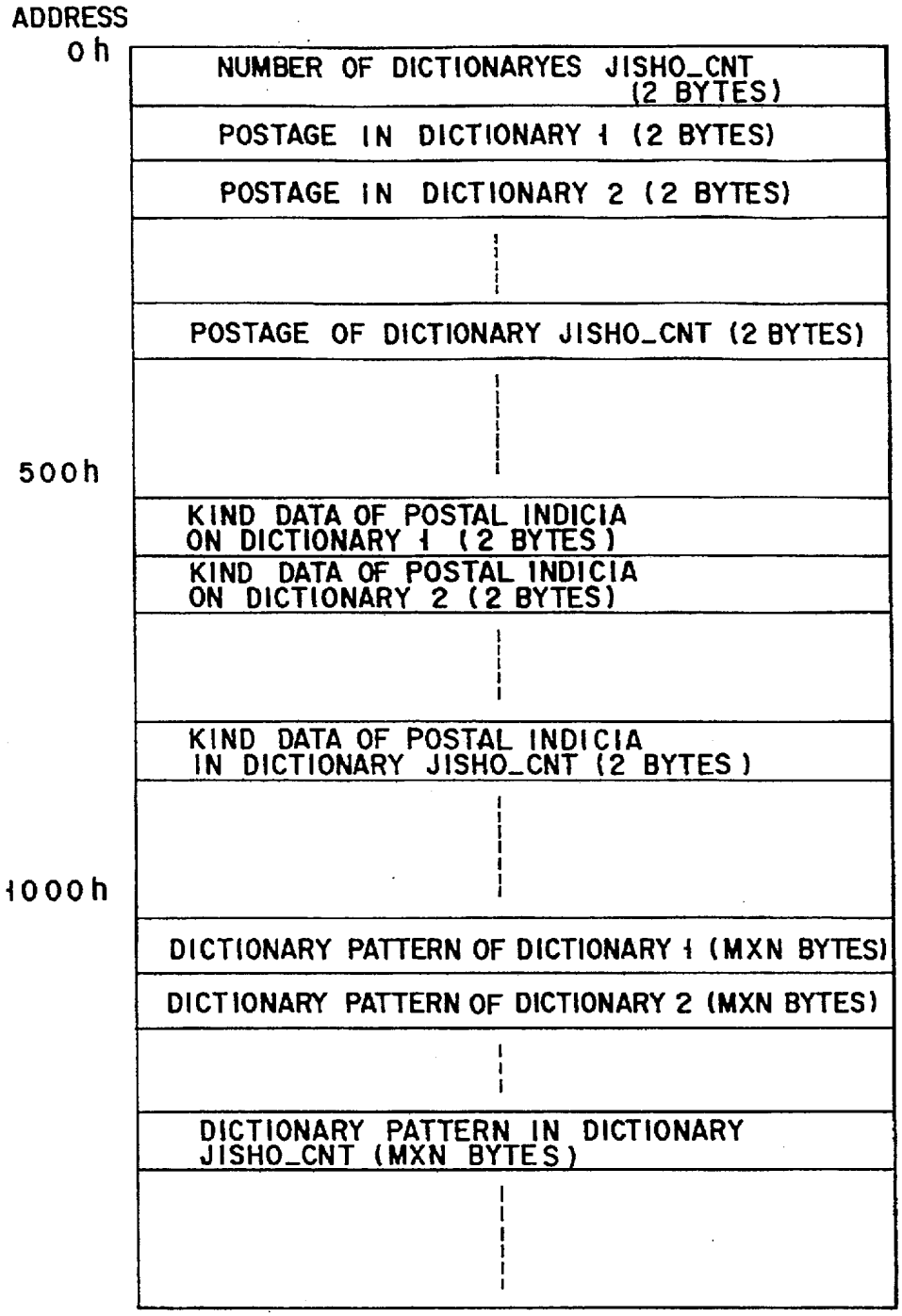

ADDRESS
0h
NUMBER OF DICTIONARYES JISHO_CNT (2 BYTES)
POSTAGE IN DICTIONARY 1 (2 BYTES)
POSTAGE IN DICTIONARY 2 (2 BYTES)
POSTAGE OF DICTIONARY JISHO_CNT (2 BYTES)
500h
KIND DATA OF POSTAL INDICIA ON DICTIONARY 1 (2 BYTES)
KIND DATA OF POSTAL INDICIA ON DICTIONARY 2 (2 BYTES)
KIND DATA OF POSTAL INDICIA IN DICTIONARY JISHO_CNT (2 BYTES)
1000h
DICTIONARY PATTERN OF DICTIONARY 1 (MXN BYTES)
DICTIONARY PATTERN OF DICTIONARY 2 (MXN BYTES)
DICTIONARY PATTERN IN DICTIONARY JISHO_CNT (MXN BYTES)

FIG. 31

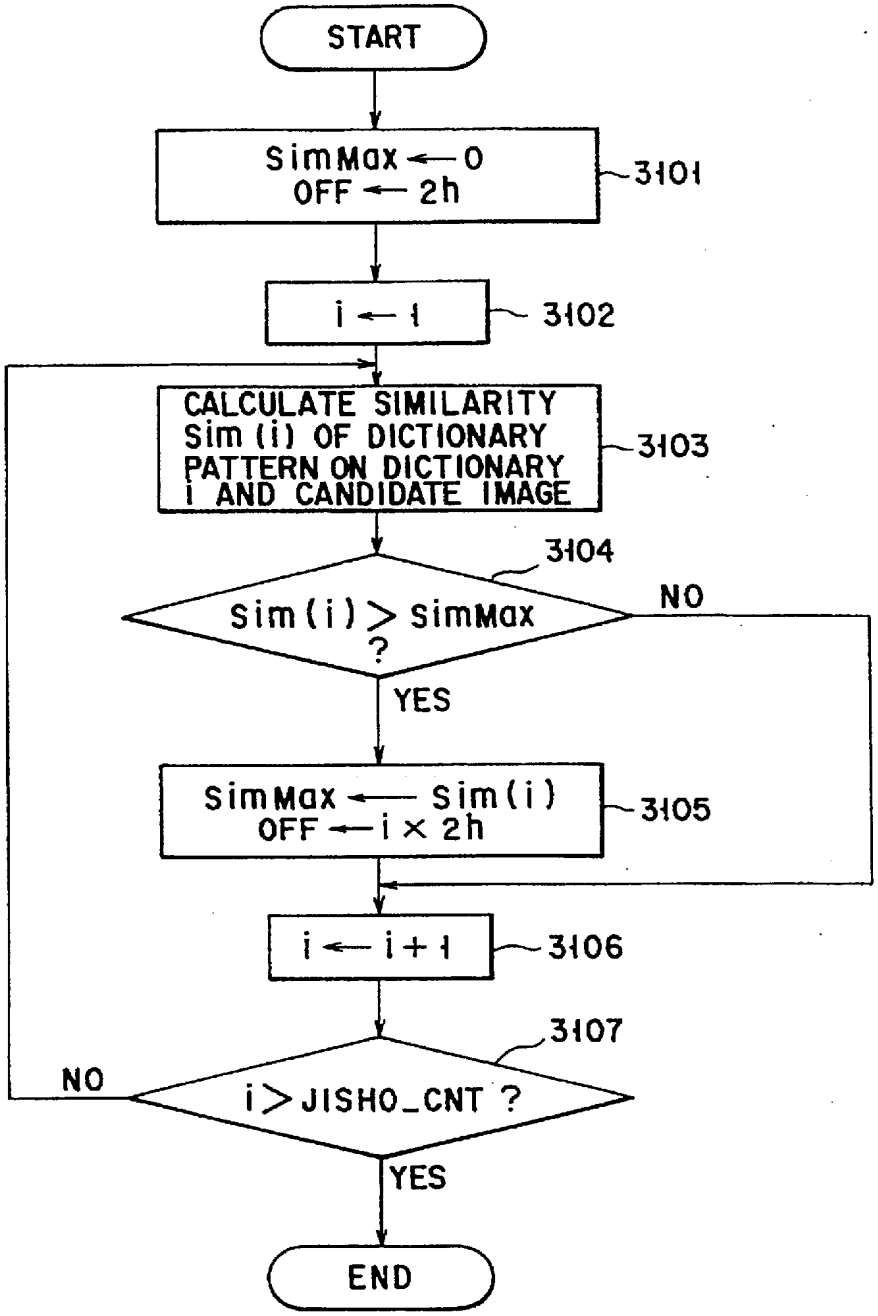

START
SimMax ← 0
OFF ← 2h
3101
i ← 1
3102
CALCULATE SIMILARITY
Sim (i) OF DICTIONARY
PATTERN ON DICTIONARY
i AND CANDIDATE IMAGE
3103
3104
Sim (i) > SimMax ?
NO
YES
SimMax ← Sim (i)
OFF ← i × 2h
3105
i ← i + 1
3106
3107
NO
i > JISHO_CNT ?
YES
END

FIG. 32

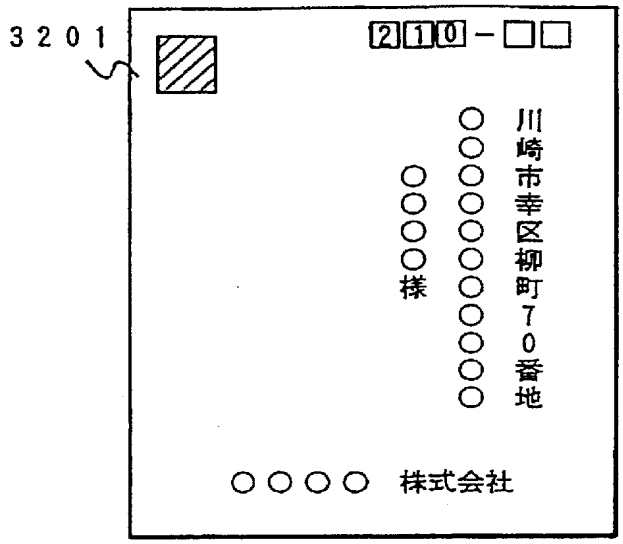

3201
210-□□
○川
○崎
○○市
○○○幸
○○○○区
○○○○○柳
○○○○○○町
○○○○○○○7
○○○○○○○○0
○○○○○○○○○番
○○○○○○○○○○地
○○○○様
○○○○ 株式会社

FIG. 33

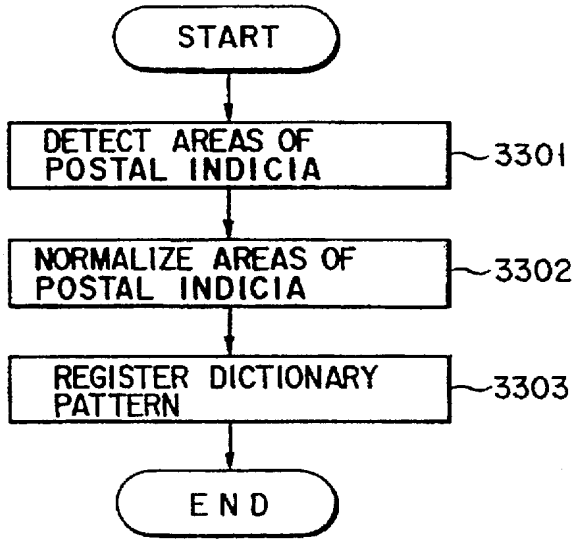

START
DETECT AREAS OF POSTAL INDICIA
3301
NORMALIZE AREAS OF POSTAL INDICIA
3302
REGISTER DICTIONARY PATTERN
3303
END

FIG. 34

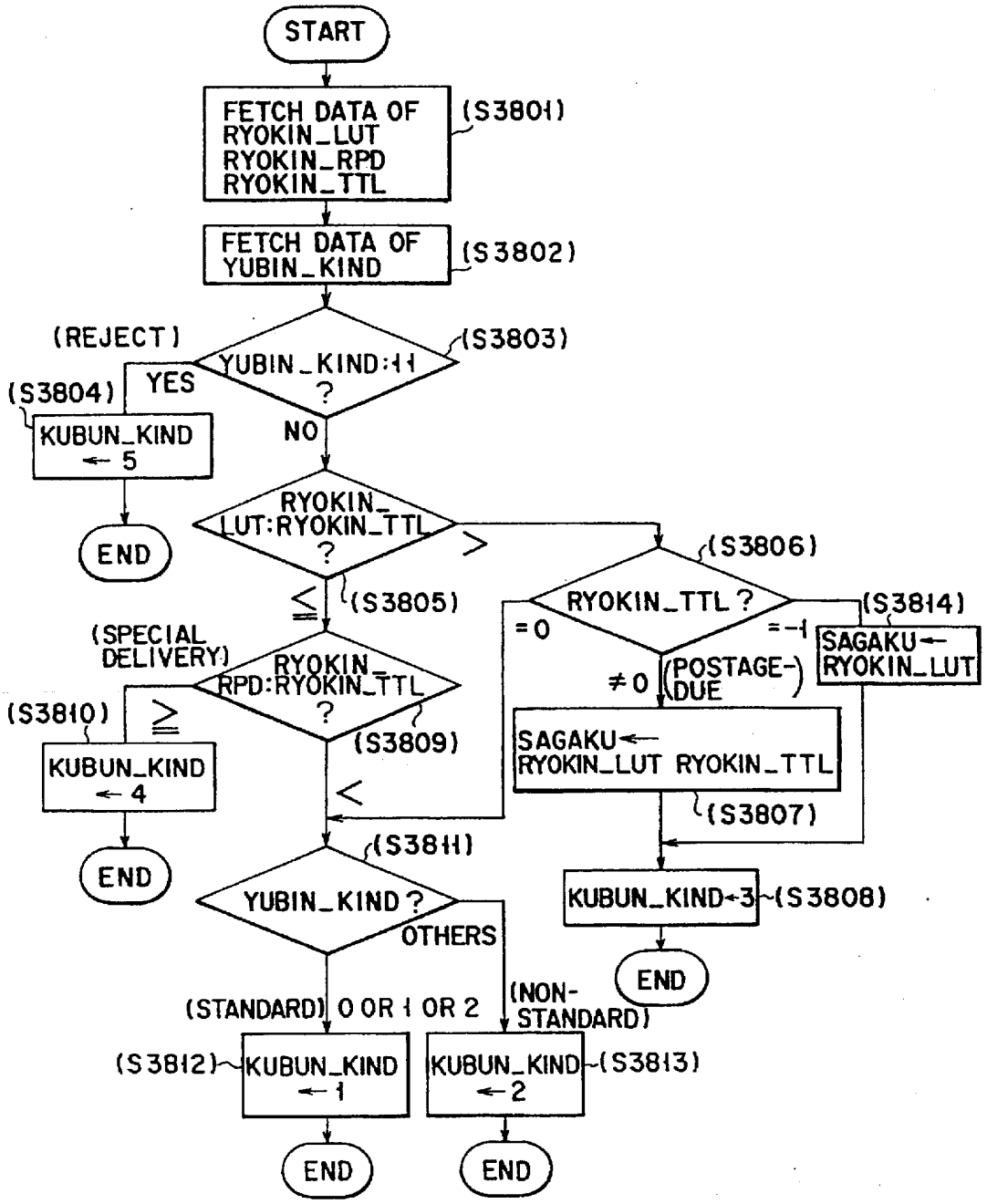

START
FETCH DATA OF RYOKIN_LUT RYOKIN_RPD RYOKIN_TTL
(S3801)
FETCH DATA OF YUBIN_KIND
(S3802)
(REJECT)
YUBIN_KIND:11 ?
(S3803)
YES
(S3804)
KUBUN_KIND ← 5
END
NO
RYOKIN_LUT:RYOKIN_TTL ?
>
(S3806)
≦
(S3805)
RYOKIN_TTL ?
(S3814)
=0
=-1
SAGAKU ← RYOKIN_LUT
≠0
(POSTAGE-DUE)
(SPECIAL DELIVERY)
RYOKIN_RPD:RYOKIN_TTL ?
(S3809)
(S3810)
≧
KUBUN_KIND ← 4
END
SAGAKU ← RYOKIN_LUT RYOKIN_TTL
(S3807)
<
(S3811)
YUBIN_KIND ?
OTHERS
KUBUN_KIND ← 3
(S3808)
END
(STANDARD) 0 OR 1 OR 2
(NON-STANDARD)
(S3812)
KUBUN_KIND ← 1
KUBUN_KIND ← 2
(S3813)
END
END

FIG. 39

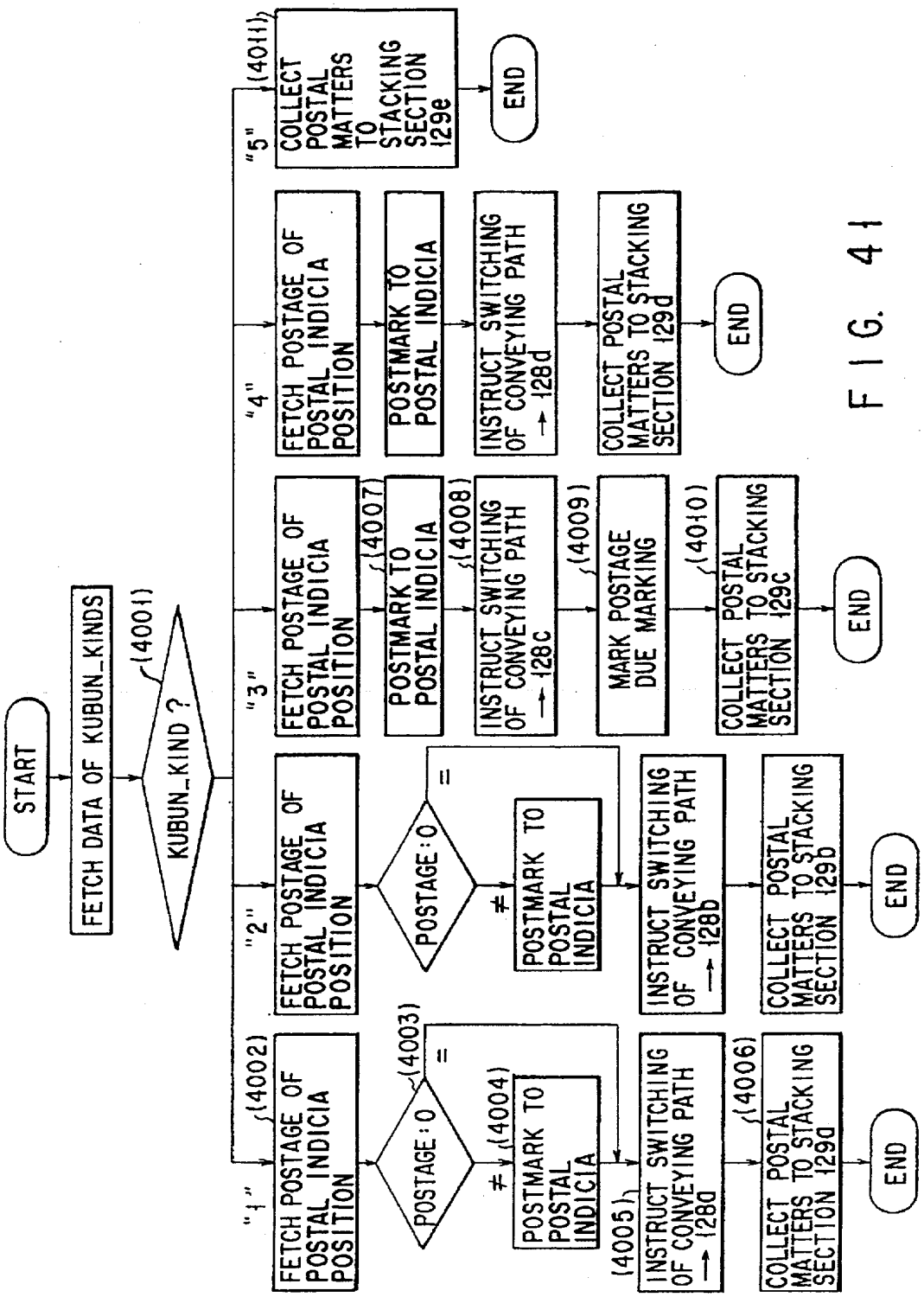

START
FETCH DATA OF KUBUN_KINDS
KUBUN_KIND ?
(4001)
"1"
"2"
"3"
"4"
"5"
FETCH POSTAGE OF POSTAL INDICIA POSITION
(4002)
POSTAGE : 0
(4003)
=
≠
POSTMARK TO POSTAL INDICIA
(4004)
(4005)
INSTRUCT SWITCHING OF CONVEYING PATH → 128a
(4006)
COLLECT POSTAL MATTERS TO STACKING SECTION 129a
END
INSTRUCT SWITCHING OF CONVEYING PATH → 128b
COLLECT POSTAL MATTERS TO STACKING SECTION 129b
(4007)
(4008)
(4009)
MARK POSTAGE DUE MARKING
(4010)
COLLECT POSTAL MATTERS TO STACKING SECTION 129c
INSTRUCT SWITCHING OF CONVEYING PATH → 128c
INSTRUCT SWITCHING OF CONVEYING PATH → 128d
COLLECT POSTAL MATTERS TO STACKING SECTION 129d
(4011)
COLLECT POSTAL MATTERS TO STACKING SECTION 129e

FIG. 41

ADDRESS		
00h	TOTAL NUMBER AT YUBIN_KIND=0	(4 BYTES)
	TOTAL POSTAGE AT YUBIN_KIND=0	(〃)
	TOTAL NUMBER AT YUBIN_KIND=1	(〃)
	TOTAL POSTAGE AT YUBIN_KIND=1	(〃)
	TOTAL NUMBER AT YUBIN_KIND=2	(〃)
	TOTAL POSTAGE AT YUBIN_KIND=2	(〃)
	TOTAL NUMBER AT YUBIN_KIND=3	(〃)
	TOTAL POSTAGE AT YUBIN_KIND=3	(〃)
	⋮	
	TOTAL NUMBER AT YUBIN_KIND=10	(4 BYTES)
	TOTAL POSTAGE AT YUBIN_KIND=10	(〃)
58h	TOTAL NUMBER AT YUBIN_KIND=4	(〃)
	TOTAL POSTAGE AT YUBIN_KIND=4	(〃)
60h	TOTAL NUMBER AT YUBIN_KIND=3	(〃)
	TOTAL POSTAGE DUE AT YUBIN_KIND=3	(〃)
68h	TOTAL NUMBER AT YUBIN_KIND=5	(〃)
6ch	TOTAL NUMBER	(〃)
	TOTAL POSTAGE	(〃)

FIG. 42

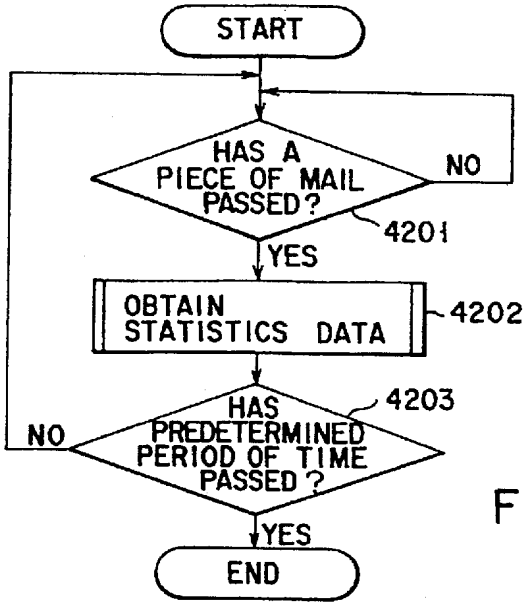

START
HAS A PIECE OF MAIL PASSED?
NO
4201
YES
OBTAIN STATISTICS DATA
4202
HAS PREDETERMINED PERIOD OF TIME PASSED?
4203
NO
YES
END

FIG. 43

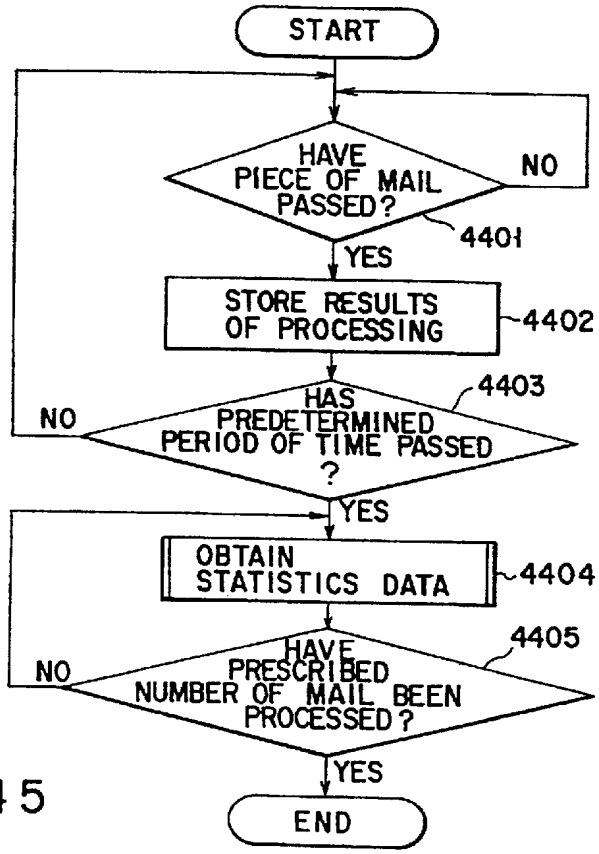

START
HAVE PIECE OF MAIL PASSED?
NO
4401
YES
STORE RESULTS OF PROCESSING
4402
HAS PREDETERMINED PERIOD OF TIME PASSED ?
4403
NO
YES
OBTAIN STATISTICS DATA
4404
HAVE PRESCRIBED NUMBER OF MAIL BEEN PROCESSED?
4405
NO
YES
END

FIG. 45

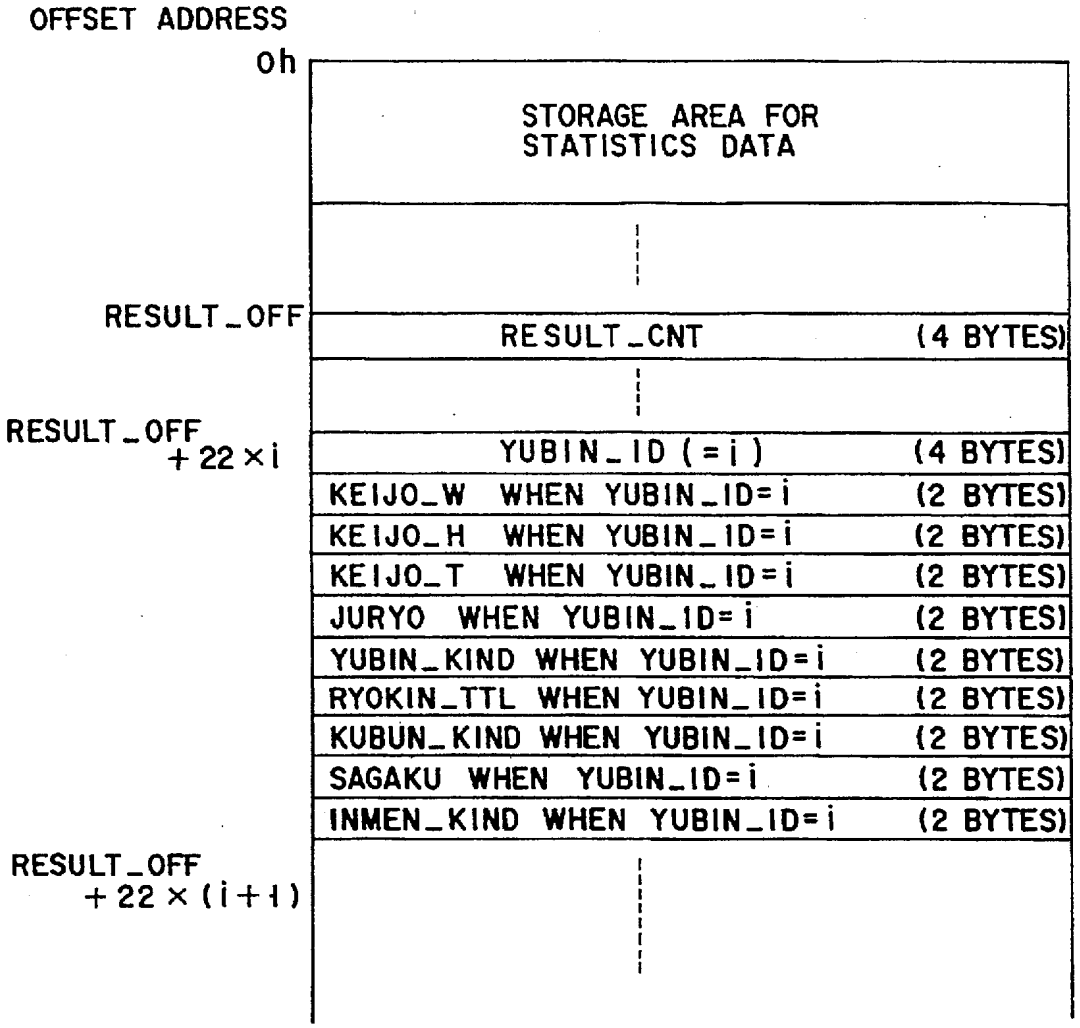

OFFSET ADDRESS
0h
STORAGE AREA FOR STATISTICS DATA
RESULT_OFF
RESULT_CNT (4 BYTES)
RESULT_OFF + 22 × i
YUBIN_ID (=i) (4 BYTES)
KEIJO_W WHEN YUBIN_ID=i (2 BYTES)
KEIJO_H WHEN YUBIN_ID=i (2 BYTES)
KEIJO_T WHEN YUBIN_ID=i (2 BYTES)
JURYO WHEN YUBIN_ID=i (2 BYTES)
YUBIN_KIND WHEN YUBIN_ID=i (2 BYTES)
RYOKIN_TTL WHEN YUBIN_ID=i (2 BYTES)
KUBUN_KIND WHEN YUBIN_ID=i (2 BYTES)
SAGAKU WHEN YUBIN_ID=i (2 BYTES)
INMEN_KIND WHEN YUBIN_ID=i (2 BYTES)
RESULT_OFF + 22 × (i+1)

FIG. 44

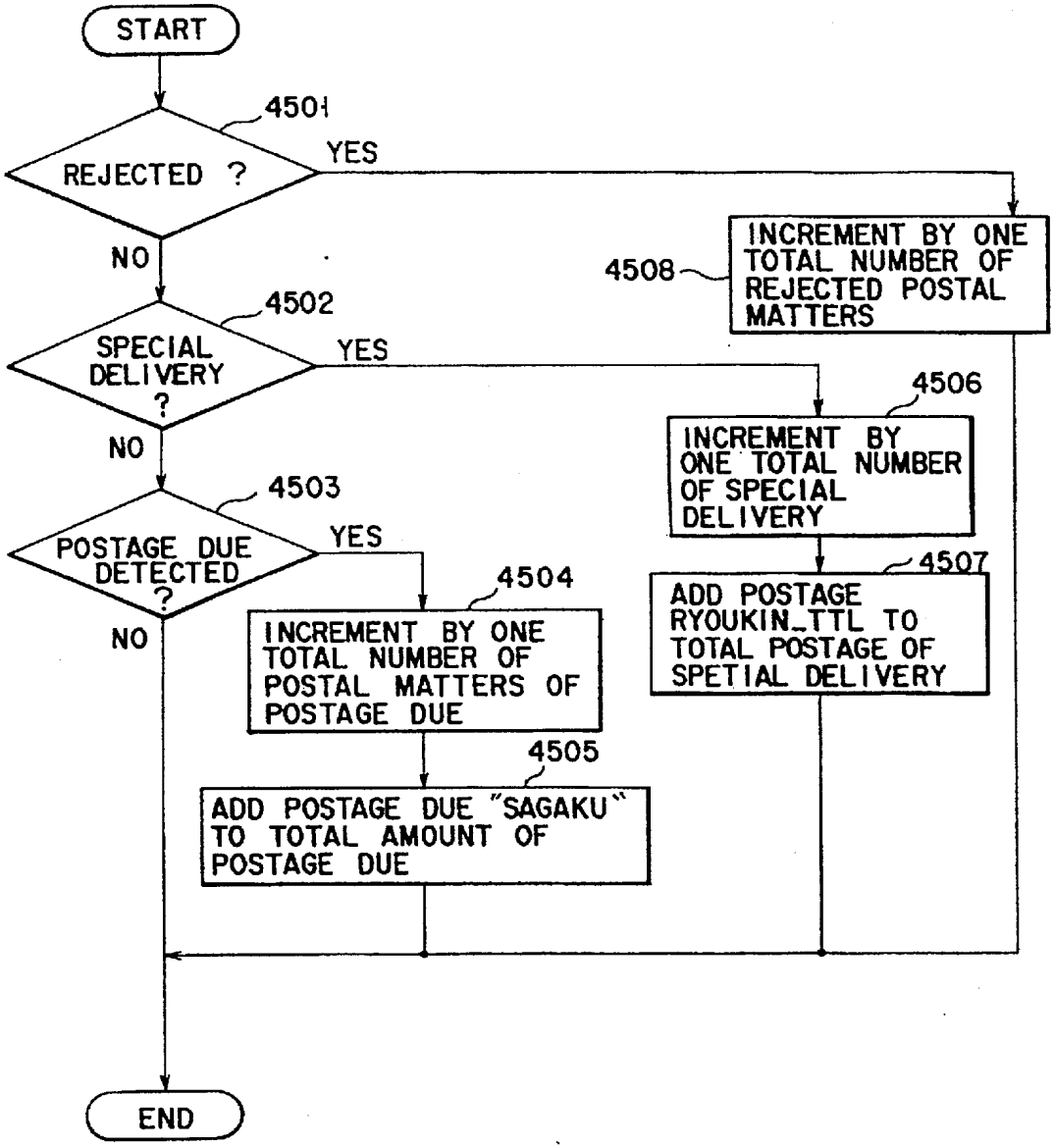
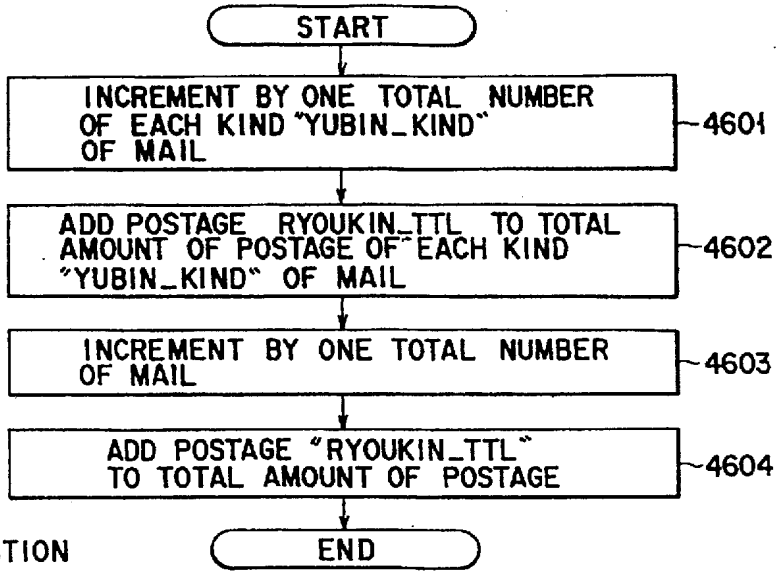
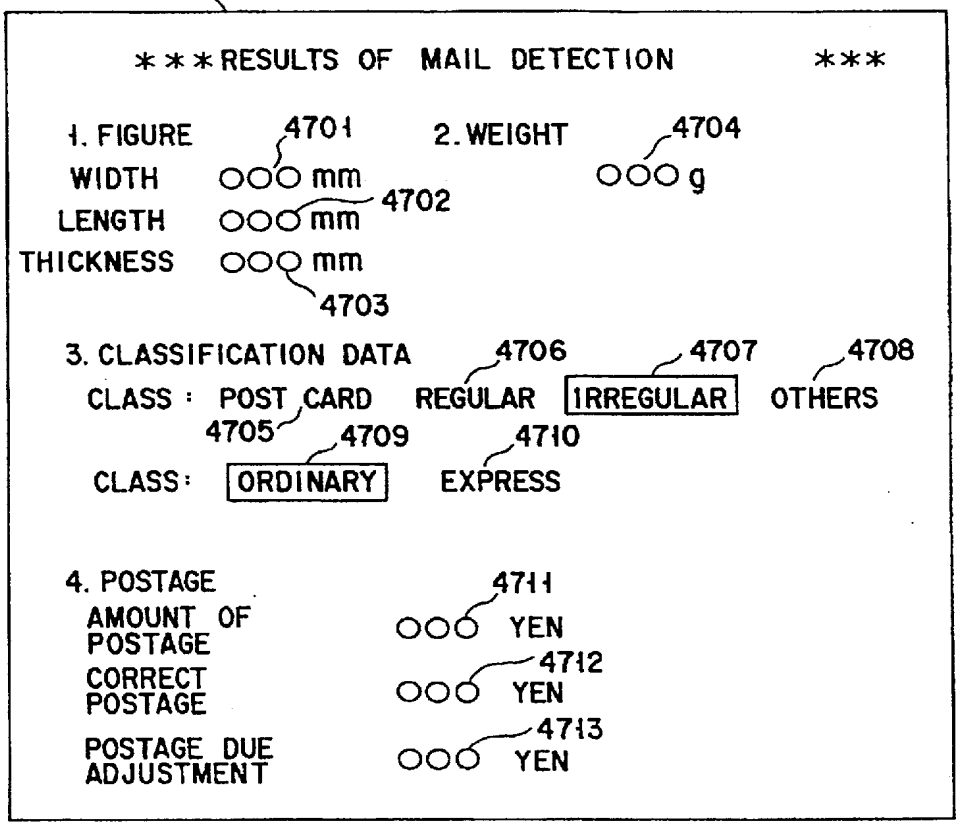

START
4501
REJECTED ?
YES
NO
4508
INCREMENT BY ONE TOTAL NUMBER OF REJECTED POSTAL MATTERS
4502
SPECIAL DELIVERY ?
YES
4506
INCREMENT BY ONE TOTAL NUMBER OF SPECIAL DELIVERY
NO
4503
POSTAGE DUE DETECTED ?
YES
4507
ADD POSTAGE RYOUKIN_TTL TO TOTAL POSTAGE OF SPETIAL DELIVERY
4504
NO
INCREMENT BY ONE TOTAL NUMBER OF POSTAL MATTERS OF POSTAGE DUE
4505
ADD POSTAGE DUE "SAGAKU" TO TOTAL AMOUNT OF POSTAGE DUE
END

FIG. 46



F I G. 47

DATA OUTPUT SECTION 123



F I G. 48

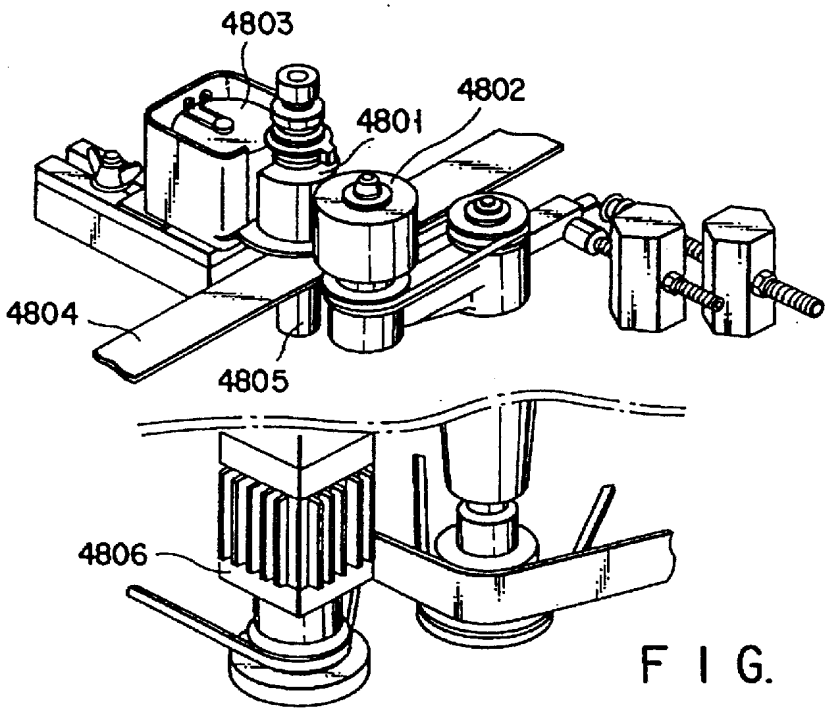

4803
4802
4801
4804
4805
4806

FIG. 49

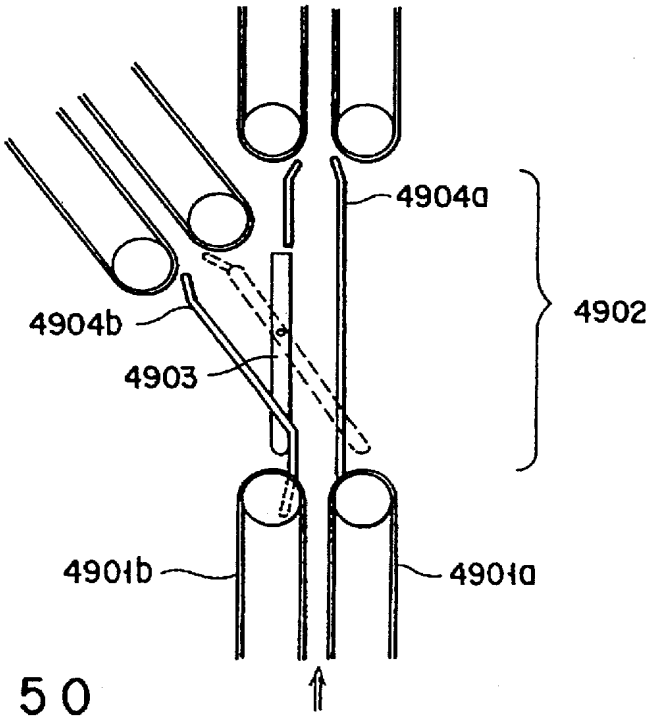

4904a
4902
4904b
4903
4901b
4901a

FIG. 50

PROCESSING APPARATUS FOR MAIL WITH STAMPS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an apparatus for processing an object such as mail wherein the type or the kind of the mail, processing/charges, etc. are detected from a postal indicia (like a stamp) and wherein physical quantities such as weight, dimensions, etc. are measured.

2. Description of the Related Art

In connection with a conventional method of determining the processing charges for mail etc., a postage determining apparatus as disclosed in Jpn. Pat. Appln. KOKAI Publication No. 2-12021 has been proposed. This apparatus enables the postage for a specified piece of mail to be read from a postage table previously stored in a nonvolatile memory and then displayed, and compared with the weight data on the piece of mail weighed at the metering section, thereby indicating the postage and the classification of the mail. With this prior art, however, only the weight is measured as physical information on a piece of mail, but the shape or size, which is one of elements determining the postage, is not measured. The operator is still required to judge and enter the kind of mail (standard-size mail, nonstandard-size mail, etc.) from the keyboard. Furthermore, only the necessary postage for the measured weight is displayed. The apparatus is not constructed so as to detect the postal indicia on a piece of mail, for example, the postal indicia of a postage stamp or an indicia by a postage meter or to automatically classify a piece of mail on the basis of the detection result.

Therefore, with such a conventional apparatus, the valid postage may not be indicated because the operator may make a mistake in judgment of the kind of the mail. Furthermore, there are various disadvantages including a heavy burden on the operator.

SUMMARY OF THE INVENTION

It is, accordingly, an object of the present invention to overcome the disadvantages by providing an object processing apparatus which measures the physical quantity information items about an object in connection with the decision of a processing charge for processing the object, calculates a valid charge on the basis of a charge table with respect to the previously stored physical quantities, detects the amount of money of the postal indicia on the object through an image information process, identifies the type of the object (e.g., the kind of mail) from the relationship between them, displays the information on a display, sorts out the piece of mail by classification, and totals the statistical data on charges, and which is automated so as to alleviate a burden on the operator, thereby preventing charges from being displayed erroneously due to misjudgment.

According to an aspect of the present invention, there is provided a mail processing apparatus comprising: means for detecting physical quantities of mail provided with a stamp so as to determine a processing charge of the mail; first determining means for determining the processing charge of the mail in accordance with the physical quantities detected by the detecting means; means for storing a plurality of reference images corresponding to images of a plurality of stamps of different postal indicia; means for extracting the images of the stamps of the mail; second determining means for determining a postal indicia of the stamp of the mail by comparing the image extracted by the extracting means with the plurality of reference images stored in the storing means; means for verifying the processing charge determined by the first determining means and the postal indicia of the mail determined by the second determining means; and third determining means for determining a processing method of the mail based on a verification result obtained by the verifying means.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate presently preferred embodiments of the invention and, together with the general description given above and the detailed description of the preferred embodiments given below, serve to explain the principles of the invention.

FIG. **1** is an overall block diagram of an embodiment of the present invention;

FIG. **2** is a perspective view of the mechanical section of the embodiment of FIG. **1**;

FIG. **3** is a perspective view of a size sensor;

FIG. **4** is a circuit block diagram of a size detection section;

FIG. **5** is a timing chart to explain the operation of the size detection section;

FIG. **6** is a flowchart for a mail width measuring process;

FIG. **7** is a circuit block diagram of a weight sensing section;

FIG. **8** is a flowchart for a mail weight measuring process;

FIG. **9** is an output-voltage characteristic diagram of an angle sensor;

FIG. **10** is a circuit block diagram of a thickness sensing section;

FIG. **11** is a flowchart for a mail thickness measuring process;

FIG. **12** is a block diagram of a line sensor;

FIG. **13** is a timing chart to explain the operation of the line sensor;

FIG. **14** is a block diagram of an image data generating section;

FIG. **15** shows the pixel arrangement of the overall image memory;

FIG. **16** shows the entire image data on mail stored in the overall image memory;

FIG. **17** is a flowchart for processing mail image data;

FIG. **18** is a flowchart for processing mail image data;

FIG. **19** shows a state in which data is stored in a temporary memory section;

FIG. **20** shows a state in which data is stored in a mail image memory;

FIGS. **21A** to **21E** show various examples of postcard with various types of postal indicia;

FIG. **22** is a flowchart for detecting the postage on the postal indicia from a mail image;

FIG. 23 is a flowchart for detecting the postage on the postal indicia from a mail image;

FIG. 24 is a flowchart for detecting the postal indicia area from a mail image;

FIG. 25 is a flowchart for determining the postal indicia candidate;

FIG. 26 shows an example of the postal indicia area in a mail image;

FIG. 27 shows an example of obtaining the postal indicia area in the longitudinal direction of mail;

FIG. 28 shows an example of obtaining the postal indicia area in the lateral direction of mail;

FIG. 29 shows an example of normalizing the postal indicia area;

FIG. 30 illustrates an example of the address map of the postal indicia image memory;

FIG. 31 illustrates an example of the address map of the postal indicia dictionary memory;

FIG. 32 is a flowchart for verifying the normalized postal indicia image with a dictionary pattern;

FIG. 33 shows an example of a postal indicia which has not been entered as a dictionary pattern;

FIG. 34 is a flowchart for entering a new dictionary pattern;

FIG. 35 shows an example of the address map of the postal indicia dictionary memory at the time of entering a new dictionary pattern;

FIG. 36 shows a list of postal rates;

FIG. 37 is a flowchart for determining the kind of mail;

FIG. 38 is a postage look-up table;

FIG. 39 is a flowchart for detecting mail classification information;

FIG. 40 shows the kind of postal matters or mail;

FIG. 41 is a flowchart for instructing the operation instruction section;

FIG. 42 shows a state where statistical data items are stored in the memory;

FIG. 43 is a flowchart for managing statistical data items;

FIG. 44 shows a state where different statistical data items are stored in the memory;

FIG. 45 is a flowchart for managing the different statistical data items;

FIG. 46 is a flowchart for acquiring the statistical data items;

FIG. 47 is a flowchart for acquiring the different statistical data items;

FIG. 48 shows a representation of the process result;

FIG. 49 is a perspective view of the postmark stamper; and

FIG. 50 is a schematic diagram of a mail distributing mechanism.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, an embodiment of the present invention will be explained, referring to the accompanying drawings. This invention can be applied to any object with postal indicia on its surface as well as mail. The explanation below will be given as to an embodiment where the invention is applied to a mail processing apparatus.

FIG. 2 is a schematic diagram of the mechanism of a mail processing apparatus according to an embodiment of the present invention. To simplify the explanation of the operation of the system according to the embodiment, only the sensing mechanism of the processing apparatus is shown in FIG. 2.

Before the processing apparatus starts an operation, pieces of mail **101** are set in a mail feeder **201** with their postal indicia **102** facing the sensing face of an optical read sensor **103**. The postal indicia indicates postage. The mail feeder **201** holds pieces of mail and performs control so that the first or top piece of mail may be pressed against a transport belt **202** at a constant pressure. This control causes pieces of mail to be conveyed one by one with the transport belt **202**. The mail feeder **201** contains a weight sensor **105** for sensing the total weight of the pieces of mail put in the feeder **201**. The weight sensor **105** measures the total weight of the remaining pieces of mail each time each piece is taken out. A mail weight sensing section (explained later) calculates the difference between the currently measured total weight and the previously measured one to obtain the weight of one piece of mail being sensed.

The piece of mail taken out of the mail feeder **201** and conveyed by the transport belt **202** is illuminated by a light source **203** such as a fluorescent lamp. Its reflected light is read by the optical read sensor **103**. In the embodiment, the optical read sensor **103** is a one-dimensional line sensor and produces two-dimensional image information by transporting the mail in the direction perpendicular to the line of the sensor. Then, a thickness sensor **106** measures the thickness of a piece of mail, and a size sensor **104** using, for example, a photosensor array, measures the outer dimensions of a piece of mail. Of those sensors, the optical read sensor **103** is provided to sense the postal indicia impression **102** indicating postage, and the remaining sensors are provided to measure the physical quantities determining postage. The position of the sensors is not necessarily in the order of FIG. **2** as long as they do not affect the system configuration.

A postmark stamper **126** is a device for postmarking the postal indicia to indicate that the stamp is valid and already used, and operates only when the postal indicia is detected from the image information obtained from the optical read sensor **103**. The pieces of mail passed through the postmark stamper **126** are distributed to mail stackers **129***a* to **129***e* by mail distributors **128***a* to **128***d* on the basis of the operation charge information determined according to the measured physical quantities of the pieces of mail. Then, the distributors perform post-processing according to the respective postage. Postage-due mark stamping machine **127** stamps a mark indicating postage due on a postage-due piece of mail.

The processing flow of the postage determining system will be explained using FIG. **1**. In FIG. **1**, there are roughly six functional blocks. After a general description of each block is given, each block will be explained in detail.

A physical quantity detection section is composed of a sensor for sensing the physical characteristics of a piece of mail to be read and a detection circuit. A size sensor **104**, a weight sensor **105**, and a thickness sensor **106** are used to sense the size, the weight, and the thickness, respectively. In the detection section, the size signal from the size sensor **104** is quantified by a size detection section **110** to obtain the length and width of a piece of mail. Since the total weight of the remaining pieces of mail in the mail feeder **201** can be known from the weight sensor **105** each time a piece of mail is conveyed, the weight of the piece of mail being transported is calculated by obtaining the difference between

the current total weight and that one piece ahead. Because the voltage signal proportional to the thickness of a piece of mail is obtained from the thickness sensor **106**, the voltage value is converted into the thickness at a thickness detection section **112**. The detected results from the size detection section **110**, weight detection section **111**, and thickness detection section **112** are all in the form of a digital signal and read by a CPU **113** via a data bus **117**.

An image data generating section has the function of determining only the mail image portion from the image data obtained from the optical read sensor **103** in the form of digital signal via an analog signal processing section **107**, an A/D converting section **108**, and an entire image memory **109**. Here, the A/D conversion means converting a continuous analog image signal into a digital image signal which can be processed by a computer. In sensing the shape or size of a piece of mail, the size data from the size sensor **104** is also referred to. The sensed image of a piece of mail is temporarily stored in a mail image memory **118** via the data bus **117**.

Data processing section comprises the CPU **113** which performs the main control of the entire system, a program storage section **114** which stores programs for image processing and system operations, a temporary memory section **115** which temporarily stores the processing data during the execution of a program, and a data storage section or a data base **116** composed of a nonvolatile memory. The data storage section **116** stores a system start-up program, OS (Operating System), and other application programs needed for the system, or the history of system operations and sum total data such as the sum total of charges.

An image data storage section comprises a mail image memory **118** for storing the image of the entire piece of mail, a postal indicia image memory **119** for storing the image of the postal indicia portion obtained from the image processing at the data processing section, a postal indicia dictionary memory **120** for storing the dictionary pattern of postal indicia, and a postage LUT (look-up table) **121** which shows the relationship between the sizes and weights of mail and postage.

An input/output section effects an interface (I/F) operation between the present system and the external system and comprises a data input section **122** such as a keyboard, a data output section **123** such as a CRT, and a data communication section **124** such as a modem connected to an external communication line **130**.

Lastly, an operation instructing section has the function of receiving the discrimination result from the data processing section and giving the system instructions to operate. When the postal indicia to be stamped such as a postmark is sensed on the current piece of mail, the CPU **113** gives the postmark stamper **126** instructions to affix a seal. The timing of postmarking the piece of mail is adjusted on the basis of the sense signals from a plurality of mail position sensors **125** provided on the transport path. The mail distribution means **128***a* to **128***d* distribute pieces of mail to mail stackers **129***a* to **129***d* according to whether the postal indicia is valid, higher or lower than the correct value, and when it is valid, whether it is standard-size or nonstandard-size mail on the basis of the shape and size of a piece of mail, its weight information, and the discrimination result of postal indicia. It is determined from the relationship between the postal indicia and the physical quantities whether it is ordinary mail or special delivery. What exceeds the range of mail in terms of size and weight is rejected and collected in the mail stacker **129***e*. Only when the postage is insufficient, the postage due mark stamping means **127** stamps a mark indicating postage due on the piece of mail.

Hereinafter, each functional block will be described in detail. First, the physical quantity detection section will be explained. FIG. **3** shows an example of the size sensor **104** composed of a light-emitting diode array **301** and a photodiode array **302**. Rays of light from the individual light-emitting diodes **303***a* to **303***f* are always projected onto photodiodes **304***a* to **304***f* facing the light-emitting diodes. The light-emitting diode is an element that converts energy emitted at the time of recombination of carriers into light, making use of the p-n junction of a semiconductor. On the other hand, the photodiode is a photoelectric transducer that generates holes and electrons within a semiconductor and thereby allows current to flow by projecting light on the p-n junction of the semiconductor. Specifically, while the light from the light-emitting diode is being projected onto the photodiode, a current is generated in the photodiode. By allowing the current to flow through a suitable load resistance, a specific voltage is obtained. Binarizing the voltage with a comparator makes it possible to judge whether or not light is being projected on the photodiode. Since a piece of mail is to pass between two arrays **301**, **302**, it is possible not only to recognize the timing of the piece of mail passing, but also to determine the width of the piece of mail from the number of shaded photodiodes. On the other hand, the length of the piece of mail is computed on the basis of the time during which the photodiodes are shaded and the transporting speed of the piece of mail.

The circuit diagram of the size detection section **110** for detecting the size of a piece of mail is shown in FIG. **4** and its timing chart is shown in FIG. **5**. In FIG. **4**, reference characters **404***a* indicate a photodiode provided at lower end of the array **302**. When light is projected onto the photodiode **404***a* from the corresponding light-emitting diode in the array **301**, current will flow in the base section of the p-n junction, thereby allowing the current amplified according to the characteristics of the semiconductor to flow between the collector and emitter. This signal is further amplified and taken out as the open collector output. The output signal is converted into a voltage at a pull-up resistor **401**, and then is compared with a reference voltage **402** at a comparator **403**. If it is higher than the reference voltage, then logic "1" is produced from the comparator **403**. If it is lower than the reference voltage, logic "0" is produced. In the circuit of the embodiment, when light strikes the photodiode **404***a*, a bright signal or a current will flow through the diode **404***a*, thus placing the "+" input of the comparator **403** at almost 0 V. As a result, the output of the comparator **403** becomes logic "0." When no light strikes, a dark signal will be generated.

The bright and dark signals from the photodiodes are outputted via corresponding comparators and supplied to a width detection buffer **404** via inverters, respectively. The output of the buffer **404** is connected to the data bus **117** of the system so as to be accessible from the CPU **113** via a size read signal **405**.

A width measuring process stored in the program storage section **114** will be described by referring to FIG. **6**. To detect that a piece of mail passes through the size sensor **104**, the size read signal **405** is generated to access the width detection buffer **404** (**S601**). A check is made to see if there is a logic "0" signal indicating that a piece of mail has been sensed (**S602**) at the input of the buffer **404**. If there is no logic "0" signal, the width sensing buffer **404** is accessed. If there are more than one logic "0" signal, the mail will be allowed to enter the shape sensor to some extent (**S603**), and

then the width detection buffer **404** is accessed again to determine the number m of sensors with logic "0" (**S604**). On the basis of the value of m, the distance between sensors, the sensor installation positions, etc, the width KEIJO_W of the piece of mail is determined (**S605**), and the determined value is stored in the temporary memory section **115**. How the sizes of and other information items on mail are stored in the temporary memory section **115** as shown in FIG. **19**. Various types of information items are stored in units of two bytes, starting at the offset address (YUBIN_INF) in the memory.

Then, the contents of the width detection buffer **404** is read (**S606**). While sensors remain present with logic "0" ("YES" at step **S606**), the process is repeated. After the sensors with logic "0" all disappear and it is verified that the piece of mail has passed in front of the size sensor **104** completely (**S607**), the process is terminated.

The outputs of the comparator **403** and the other comparators are supplied to a NAND circuit **406**, the output signal PENA **408** of which is connected to the enable terminal of a length counter **407**. The clock terminal of the length counter **407** is supplied with an LSYNC **409** that becomes logic "1" each time the piece of mail advances 1 mm. The counter **407** counts up as long as a PENA signal **408** is "1." The counter output CNT **410** is supplied to the length detection buffer **411**.

A count-up timing chart is shown in FIG. **5**. After the CPU **113** has verified that all the signals to the width sensing buffer **404** are "1" and the piece of mail has passed through the size sensor **104**, CPU **113** outputs a count read signal **412** to read in the value of the CNT **410**, thereby storing the length of the piece of mail KEIJO_H at a specific address in the temporary memory section **115**. In the embodiment, the value of CNT **410** corresponds to the length of the piece of mail in millimeters. Finally, the CPU **113** supplies a counter rest signal **413** to the length measuring counter **407** to clear the counter **407**.

For the weight sensor **105**, a measuring instrument for converting weight into an electric signal such as a gauge load converter can be used.

FIG. **7** is a block diagram of the weight detection section. The weight sensor **105** produces a voltage in proportion to the total weight of the pieces of mail placed in the mail feeder **201**. After the voltage has been amplified by an amplifier **701**, it is converted into a digital signal by an A/D converter **702**, the output of which is connected to a weight detection buffer **703**.

A weight measuring process stored in the program storage section **114** will be described with reference to FIG. **8**. With pieces of mail to be processed at a time placed in the mail feeder **201**, a weight read signal **704** from CPU **113** is used to read the value of the weight detection buffer **703** to measure the initial weight W_0 (**S801**). After the mail position detector **125** etc. have detected that a piece of mail has been conveyed ("Yes" in step **S802**), the weight (Wn) of the remaining pieces of mail is measured (**S803**). Otherwise, while "NO" is obtained at **S802**, step **S802** is repeated until a piece of mail has been conveyed. The difference W_D between this weight and the previously measured weight (Wn−1) is computed (**S804**). After the difference W_D is multiplied by constant "a" to convert it into grams, the resulting value is stored as JURYO at a specific address in the temporary memory section **115** (**S805**). The above calculation is repeated until W_D is zero, or the mail feeder **201** is empty (**S806**).

Finally, for the thickness sensor **106**, an angle sensor using, for example, a magnetic reluctance element, can be used. The angle sensor is a sensor for converting the rotational angle of a shaft into a voltage. Its output characteristics are shown in FIG. **9**. FIG. **9** has the shaft rotational angle on the abscissa and the output voltage on the ordinate, wherein the voltage increases and decreases with the shaft rotation angle, centered at the offset voltage V_{OFF}. Since there is a proportional relationship between angles and voltages, particularly in an angle area "a" near V_{OFF}, this area "a" is usually used as a thickness sensing area.

FIG. **10** is a block diagram of the thickness detection section. In the figure, two rollers **1001**, **1002** are placed so as to face each other with a transport path between them. The roller **1001** is a movable roller which is urged by a spring (not shown) to the roller **1002** and moves in the dark arrow direction when a piece of mail passes. The other is a fixed roller **1002**. In this case, the movement of the movable roller **1001** corresponds to the thickness of a piece of mail. A free end of a leaf spring **1003** abuts on an axis of the roller **1001** and converts the movement of the movable roller **1001** into a rotational angle of a shaft **106***a* of the sensor **106**, which is transmitted to the thickness sensor **106** acting as an angle sensor. The thickness sensor **106** produces a voltage proportional to the thickness of a piece of mail. After the voltage is amplified by an amplifier **1004**, it is converted into a digital signal by an A/D converter **1005**, the output of which is connected to a thickness detection buffer **1006**.

A thickness measuring process stored in the program storage section **114** will be described with reference to FIG. **11**. After the mail position detection sensor **125** etc. have detected that a piece of mail is passing through the thickness sensor **106** ("Yes" obtained in step **S1101**), the maximum value T_{MAX} of the thickness is initialized (**S1102**). Otherwise, the process repeats until a piece of mail is detected (while "NO" is obtained at step **S1101**). Then, a thickness read signal **1007** is supplied from CPU **113** to read the value of the thickness detection buffer **1006** to measure thickness T (**S1103**). When comparison of thickness T with the maximum value T_{MAX} (**S1104**) shows that the former is larger than the latter, the maximum value is replaced with T (**S1105**). The process returns to step **S1103** while the piece of mail is present ("YES" at step **S1106**). After the mail position detection sensor **125** etc. have sensed that the piece of mail has exited the thickness sensor **106** ("NO" obtained in step **S1106**), the maximum value T_{MAX} is multiplied by a constant "a" to convert it into millimeters and then the thickness of the piece of mail KEIJO_T is stored at a specific address in the temporary memory section **115** (**S1107**).

The image data generating section will be explained. CCD sensors widely used as the input device for an image input unit are available as two-dimensional area sensors and one-dimensional line sensors. When an object or a piece of mail to be read is being transported, a two-dimensional image can be formed with a one-dimensional line sensor.

FIG. **12** shows the structure of a line sensor, an example of the optical read sensor **103**. In the center of the line sensor, there is a photodiode array **1201** composed of a photoelectric transducer. On either side of the array, a storage electrode **1202**, a shift gate **1203**, and a CCD analog shift register **1204***a* are placed. The shift gate **1203** is supplied with the HSYNC signal **1301** shown in the timing chart of FIG. **13**. This signal is used to transfer the charges accumulated in a photodiode array **1201** during one-line read time τINT to CCD analog shift registers **1204***a* (odd-numbered pixels) and **1204***b* (even-numbered pixels). After the charges have been transferred through two routes to an output gate **1205** with driving clocks ϕ1A, ϕ1B (**1302**) and

φ2A, φ2B (1303), the charge is initialized pixel by pixel with reset clock RS (1304) and undergoes charge-to-voltage conversion, and the resulting voltage (1309) is supplied from an OS terminal to an outside circuit. In the case of this sensor, the number of effective pixels is 1024. In front of the effective pixels, there are 72 dummy pixels D1 to D72, of which 48 pixels are light shielding pixels for clamping the off-set voltage of the sensor and start and end 12 pixels are blind feeding pixels.

FIG. 14 is a functional block of the image data generating section. The driving clock for the optical read sensor 103 is generated at a clock generator circuit 1402 in the analog signal processing section 107. After the output signal of the optical read sensor 103 is stabilized in signal level at a sample/hold circuit 1401, it is supplied to the noninverting input of a differential amplifier 1406 and a switch circuit 1403. The switch circuit 1403 turns on only in the light shielding portion of the CCD image signal, and charges the voltage during that time in a capacitor 1404. Because the voltage 1405 is applied to the noninverting input of the differential amplifier 1406, only the effective alternating-current component from which the offset voltage of the CCD signal has been removed is extracted and supplied to the A/D converting section 108 in the next stage. The A/D converting section has the function of converting an analog signal into a digital signal. For this purpose, an 8- to 10-bit A/D converter is usually used. The mail image data converted into a digital signal is stored in the entire image memory 109.

Using FIGS. 15 to 18, a mail image extracting process stored in the program storage section 114 will be explained. FIG. 15 shows an image of the entire image memory 109, which is composed of w pixels in the horizontal direction and h pixels in the vertical direction. Data D1 on the top left pixel is stored at the start address in the memory. To the right, w pixels are arranged consecutively in the lateral direction. Following the last pixel Dw in a first low, a first pixel Dw+1 in a second row is arranged. Pixel Dw*h at the bottom right is written at the end address in the entire image memory 109. FIG. 16 shows an image of a piece of mail written on the memory. Reading is effected by the optical read sensor 103 with a dark background to make the background image of the mail dark. The hatched portion in the figure indicates the dark image.

The process of removing the background dark portion from the image will be explained, referring to FIGS. 17 and 18. The projection is computed line by line in the lateral direction of the entire image memory 109 (S1601). The projection is obtained by simple addition of w pixels. Next, projection value Xn in n-th row is compared with threshold value Xt in the lateral direction, then binarization is effected as follows: when $Xn<Xt$, Xn=0, and when $Xn \geqq Xt$, X=1 (S1603, S1604). After the same process has been carried out for one line (S1605, S1606), the same projection process is also performed in the vertical or longitudinal direction (S1607 to S1612). Since it can be judged that the area where the binarized projection value is "1" is the range where a piece of mail exists, the starting point (Xs, Ys) of the "1" area and its end point (Xe, Ye) are calculated in either direction (S1613), and then the number of pixels in the width direction YUBIN_W=Xe−Xs+1 and the number of pixels in the longitudinal direction YUBIN_H=Ye−Ys+1 are obtained (S1614). The YUBIN_W and YUBIN_H and the image in the area are transferred to the mail image memory 118 in the image data storage section (S1614).

How the image data is stored in the mail image memory 118 is shown in FIG. 20. The data YUBIN_W for width is stored in two bytes from the start address, the YUBIN_H for length is stored in the next two bytes, and the image in the mail area (W×H pixels) is stored in a fifth byte and later.

While in the physical quantity detection section, the width and length of a piece of mail are measured using the size sensor 104 and the size detection section 110, the size may be determined from the above YUBIN_W and YUBIN_H data. That is, the value obtained by converting YUBIN_W into millimeters represents the width and that obtained by converting YUBIN_H into millimeters indicates the length.

Using the information processing section and the image data storage section, the process of computing the postage of the postal indicia from the mail image stored in the mail image memory 118 will be explained.

Postal indicia include the postal indicia of postage stamp or government-printed post-card as shown in areas 2001, 2002 in FIG. 21A, a postage meter impression as shown by 2003 in FIG. 21B, a separately paid impression as shown by 2004 in FIG. 21C, a postpaid impression as shown by 2005 in FIG. 21D, and a collect impression as shown by 2006 in FIG. 21E. Information indicating the types or kinds of such postal indicia is defined as follows under INMEN_KIND:

Kind of postal indicia	INMEN_KIND
Not postal indicia	0
Postage stamp	1
Postage meter impression	2
Separately paid impression	3
Postpaid impression	4
Collect impression	5
Other postal indicia	6

To detect the above postal indicia and compute the postage from a postage stamp or a meter impression, the processing procedures as shown in FIGS. 22 and 23 are stored in the program storage section 114.

A postal indicia candidate area is detected from the mail image stored in the mail image memory 118 according to the processing procedures for detecting a plurality of postal indicia (S2101).

This detection means is composed of the processing procedure as shown in FIG. 24. The CPU 113 reads out the number of pixels in the lateral direction of mail YUBIN_W data stored in the two-byte area beginning with the start address in the mail image memory 118, and the number of pixels in the longitudinal direction of mail YUBIN_H data stored in the next two-byte area and determines a postal indicia detecting area such as the shaded area in FIG. 26 which has W pixels in the lateral direction and H pixels in the longitudinal direction, beginning with the top left pixel, determined by the lateral and the longitudinal length, YUBIN_W and YUBIN_H, respectively (S2201). A method of computing the number of pixels in the lateral direction W and the number of pixels in the longitudinal direction H of the postal indicia detecting area is to determine the number of pixels in the lateral direction W and the number of pixels in the longitudinal direction H of the postal indicia detecting area so that W and H may have constant reduction rates of 1/Rw and 1/Rh with respect to the number of pixels in the lateral direction YUBIN_W and the number of pixels in the longitudinal direction YUBIN_H, respectively.

$$W=YUBIN\_W/Rw,\ H=YUBIN\_H/Rh$$

For example, if Rw=4, Rh=4, the postal indicia detecting area with the number of pixels in the lateral direction W and

the number of pixels in the longitudinal direction H, beginning with the top left has an area of 1/16 the mail image area.

Of the mail image stored starting at the fifth byte in the mail image memory **118**, the image data in the postal indicia detecting area detected at step **2201** is binarized with, for example, a threshold value of **128** (THR), and the result is stored in the temporary memory section **115** (**S2202**). After the total number of postal indicia candidate areas RYOGAKU_CNT is set to **0** (**S2203**), pixels related to the postal indicia image, for example, dark pixels, are totalized in the longitudinal direction with respect to the binarized image in the postal indicia area stored in the temporary memory section **115**, and the peripheral distribution as shown in FIG. **27** is obtained (**S2204**). From the peripheral distribution, concatenating ranges where the totalized data is not 0 and whose length is a reference concatenating length Wstd or more (e.g., 10 pixels or more) are obtained in sequence. Those concatenating ranges are determined to be lateral postal indicia candidate ranges. The total number p of lateral postal indicia candidate ranges, and the start and the end position of each range xs(i), xe(i) [i=1, 2, . . . , p] are obtained (**S2205**). At this time, if no concatenating range where the accumulated data is not 0 is the reference concatenating length Wstd or more, the total number p of lateral postal indicia candidate ranges will be 0. Next, a check is made to see if the total number p of lateral postal indicia candidate ranges is 0 (**S2206**). If it is 0, the total number of postal indicia candidate areas RYOGAKU_CNT (=0) is stored in the two-byte area beginning with the start address in the postal indicia image **119** (**S2211**). Then, the process at step **S2101** in FIG. **22** is terminated.

If the total number p of lateral postal indicia candidate ranges is not 0, a postal indicia candidate area is obtained from the first column candidate area determined by the lateral start position xs(**1**) and end position xe(**1**) and the longitudinal start and end positions of the postal indicia detecting range (**S2208**).

This detection means is composed of, for example, the processing procedure as shown in FIG. **25**. Pixels related to the postal indicia image, for example, dark pixels are accumulated in the lateral direction with respect to the binarized image in the first column candidate area, and the peripheral distribution as shown in FIG. **28** is obtained (**S2301**). From the peripheral distribution, data concatenating ranges where the accumulated data is not 0 and whose length is the reference concatenating length Hstd or more (e.g., 10 pixels or more) are obtained in sequence. The total number q of those concatenating ranges, and the start and the stop position of each range ys(j), ye(j) [j=1, 2, . . . , q] are determined (**S2302**). If the total number q of concatenating ranges is 0 ("Yes" at step **2303**), the process at step **S2208** will be terminated. If the total number q of concatenating ranges is not 0 ("NO" at step **2303**), the program proceeds to step **2304** where a counter j is initialized. Next, the longitudinal start and end positions ys(i), ye(j) obtained at step **S2302** and the lateral start and end positions xs(**1**), xe(**1**) of the first-column candidate area are stored in the temporary memory section **115** (step **2305**), and the counter j is incremented (step **2306**) and compared to the total q (step **2307**). This process is repeated for all start and end positions (while "NO" is obtained at step **2307**) until all positions are stored ("YES: is obtained at step **2307**). Then, q is added to the total number of postal indicia candidate areas RYOGAKU_CNT (**S2308**).

The start and end positions of all postal indicia candidates in the candidate areas until the p-th column are obtained (step **2210**) in a similar manner to the procedure for obtaining the start and end positions of the postal indicia candidate in the first-column candidate area, and the results have been stored in the temporary memory section **115** in sequence, by incrementing a counter i (step **2209**) initialized in step **2207**. Thereafter (when "YES" is obtained at step **2210**), the total number of postal indicia candidate areas RYOGAKU_CNT is stored at the start address of the postal indicia image **119** (**S2211**). Then, the process at step **2101** in FIG. **22** is terminated.

After the postal indicia candidate area has been detected at step **2101**, the program proceeds to step **2102** where the postal indicia image memory **119** is accessed to read the total number of postal indicia candidate areas RYOGAKU_CNT. If RYOGAKU_CNT is 0 ("Yes" at step **2102**) it is judged that there is no postal indicia candidate area. Then, the program proceeds to step **2115** of FIG. **23** where the postage of the postal indicia RYOKIN_TTL is set to −1, the postal indicia type information INMEN_KIND is set to 0, and then the process is terminated. If RYOGAKU_CNT is larger than 0 ("NO" at step **2102**) that is, if a postal indicia candidate area is present, the program proceeds to step **2103** where the start and end position information items on as many postal indicia candidate ranges as RYOGAKU_CNT stored in the temporary memory section **115** are read sequentially. The image data on the rectangular area of the mail image **118** determined by those two points is stored in the temporary memory section **115** in sequence. Each postal indicia candidate area is normalized to fit it into the M x N-pixel dictionary pattern. For example, to normalize an image f (x, y) in the postal indicia candidate area whose start and end positions are xss, xse, yss, and yse as shown in FIG. **29** to an M x N image g (x, y), the following conversion is effected:

$$g(x,y)=f\ (int((x-xss)*M/(xse-xss+1))$$

$$int((y=yss)*N/(yse-yss+1)))$$

where y=int (x) represents a function used to determine the maximum integer that does not exceed x.

The normalized result is stored in the postal indicia image memory **119**. At this time, for example, the image data in the postal indicia candidate area 1 is stored in the M×N-byte area, beginning with the third byte at the start address in the postal indicia image memory **119** as shown in FIG. **30**. Similarly, the images in as many postal indicia areas as RYOGAKU_CNT are stored in the postal indicia image memory **119**.

Next, at step **2104**, postage RYOKIN_TTL is initialized to 0. Then, j indicating the number of areas detected not to be postal indicia candidates as a result of collating with a dictionary pattern (explained below) concerning as many postal indicia candidate areas as RYOGKU_CNT, is initialized to 0. Thereafter, the image data in the M×N postal indicia candidate area **1** stored beginning with the third byte at the start address in the postal indicia image memory **119** is verified with each dictionary image pattern in the postal indicia dictionary memory **120** (step **2105**).

The dictionary pattern in the postal indicia dictionary memory **120** is stored in the form of an address map as shown in FIG. **31**. In the two-byte area at the start address in the postal indicia dictionary memory **120**, the total number of dictionary patterns JISHO_CNT is stored. From the third byte at the start address in the postal indicia dictionary memory **120**, as many processing charges indicated by the individual dictionary patterns as JISHO_CNT are stored in consecutive two-byte areas. From address 500

h, as many information items INMEN_KIND representing the kinds of postal indicia indicated by each dictionary pattern as JISHO_CNT are stored in consecutive two-byte areas. From address 1000 h in the postal indicia dictionary memory **120**, as many individual dictionary patterns with a size of M×N as JISHO_CNT are stored consecutively. In the case of postal indicia from which the processing charges cannot be known, such as separately paid impressions or postpaid impressions, 0 is stored as the charge.

The procedure for performing the verification with respect to a dictionary pattern at step **2105** is as shown in FIG. **32**, for example. First, the maximum value SimMax of similarity to be the first candidate is initialized to 0, and off indicating the start address in the charge storage area for the dictionary pattern with the maximum similarity is set to 2 h (step **3101**).

The similarity between the image data in the postal indicia candidate area 1 and the first dictionary pattern i (initialized in step **3102**) stored beginning with address 1000 h in the postal indicia dictionary memory **120** is calculated (step **3103**).

If normalized two-dimensional image data g (x,y) with a size of M×N is expressed by a one-dimensional data string P(k) [k=1, 2, . . . , M×N], and similarly dictionary image data v(x,y) is expressed by a reference pattern D(k), an equation for determining the similarity is expressed as equation (1):

$$Sim = \Sigma(p(k) \times D(k)) / (\sqrt{\Sigma(P(K))^2 \times (D(k))^2}) \quad (1)$$

If the similarity with the dictionary pattern i thus calculated is greater than the maximum similarity SimMax, ("Yes" at step **3104**) the maximum similarity SimMax is replaced with the dictionary pattern i and off indicating the start address in the charge storage area for the dictionary pattern with the maximum similarity is set at 2 (step **3105**). Otherwise ("NO" at step **3104**), the process proceeds to step **S3106** where counter i is increment. Similarly, the similarity between the image data in the postal indicia candidate area **1** and the dictionary pattern i stored beginning with the (1000 h+M×N×i)-th byte at the start address in the postal indicia dictionary memory **120** is computed in sequence. If the similarity with the dictionary pattern i is greater than the maximum similarity SimMax, the maximum similarity SimMax is replaced with the similarity with the dictionary pattern i and OFF indicating the start address in the charge storage area for the dictionary pattern with the maximum similarity, is set to 2×i (step **3105**). This process is repeated as many times as the total number of dictionary patterns JISHO_CNT in the postal indicia dictionary memory **120**, ("NO" at step **3107**) and process returns to step **3103**. Otherwise, the process terminates ("YES" at step **3107**).

After the verification with respect to the dictionary patterns has been completed at step **2105**, the maximum similarity obtained at step **2105**, or the first candidate similarity SimMax is compared with a similarity reference value Simstd (e.g., 0.9) (step **2106**). If the first candidate similarity SimMax is lower than the similarity reference value Simstd, it is determined that the postal indicia candidate area does not contain a postal indicia, the number of unsuitable ranges j is increased by 1 (step **2113**). Then, the operation proceeds to step **2110** of FIG. **23**. While, if the first candidate similarity SimMax is the similarity reference value Simstd or more, the processing charge stored in the two-byte area beginning with off indicating the start address for the charge storage area for the dictionary pattern with the first candidate similarity SimMax is read out, and furthermore, postal indicia candidate information INMEN_KIND stored in the two-byte area beginning with 500 h+(off−2 h) is read out (step **2107**). Then, a check is made to see if INMEN_KIND is larger than **2**, that is, to see if the image in the postal indicia candidate area is a postal indicia from which the processing charge cannot be known, such as a separately paid impression or a postpaid impression (**2108**). If it is a postal indicia from which the rate cannot be known, the total rate RYOKIN_TTL in the postal indicia is set to 0 (step **2114**). Then, the process is terminated. If it is a postage stamp or a postage meter impression, the charge thereof is added to the accumulated total charge of postal indicia RYOKIN_TTL (step **2109**).

Then, a similar process is performed repeatedly on the images in the remaining (RYOGAKU_CNT−1) postal indicia candidate areas stored beginning with the (M×N+3)-th byte at the start address in the postal indicia image memory **119** (steps **2110**, **2111**).

After the repeated process is completed, it is determined at step **2112** whether or not the unsuitable area j is equal to the number of postal indicia candidate areas RYOGAKU_CNT. If it is not equal to the latter, the process is terminated. If it is equal to the latter, control goes to step **2115**.

The process of registering the image pattern of a new postal indicia into the postal indicia dictionary **120** will be described. The processing procedure is as shown in FIG. **34**, for example. When the image of a piece of mail with a stamp not registered into the postal indicia dictionary **120** such as the postage stamp **3201** in FIG. **33** is stored in the mail image memory **118**, for example, the postal indicia area is detected in a similar manner as step **2101** of FIG. **22** (step **3301**). Then, the postal indicia area is normalized to a size of M×N in a similar manner as step **2103** (step **3302**). By inputting a pattern registration instruction from the data input section **122** such as a keyboard, the value of JISHO_CNT+1 is stored in the two-byte area beginning with the start address, with the memory arrangement as shown in FIG. **35**, for example, in addition to as many already stored dictionaries as JISHO_CNT, the postal indicia of the stamp is stored in the two byte area beginning with the (2×(JISHO_CNT+1)+1)-th byte at the start address, "1" indicating a postage stamp is stored in postal indicia type information INMEN_KIND stored in the two-byte area beginning with address 500 h+2×JISHO_CNT, and a dictionary pattern is entered into the M×N byte area beginning with address 1000 h+M×N×JISHO_CNT (step **3303**). Similarly, such registration procedures hold true for image patterns other than postage stamps, such as postage meter impressions, separately paid impressions, postpaid impressions, or collect impressions.

The process of detecting the class of mail from the physical information on mail will be described.

A list of rates for first-class mail and second-class mail in Japan as of May 1993 is shown in FIG. **36**. Mail is broadly divided into two types: standard-size mail and nonstandard-size mail. Furthermore, by weight, standard-size mail is subdivided into two divisions and nonstandard-size is subdivided into eight divisions. Standard-size mail is defined as mail with a length of 140 to 235 mm, a width of 90 to 120 mm, a thickness of less than 10 mm, and a weight of less than 50 g. Mail which does not meet these requirements is defined as nonstandard-size mail. It should be noted that mail with a length of less than 140 mm and a width of less than 90 mm, or mail one side of which is 600 mm or more or the total of three sides of which is 900 mm or more, or mail weighing 4 kg or more is not treated as ordinary mail.

A mail type detecting process stored in the program storage section **114** will be described. On the basis of the information obtained at the physical quantity detection sec-

tion, it is determined which of classes No. 0 to 10 in FIG. 36 the piece of mail detected falls under. FIG. 37 shows a processing flow, and FIG. 38 shows a postage look-up table (LUT) 121 prepared on the basis of the list of rates in FIG. 36. Before explanation of the flow, the contents of the LUT will be explained.

	Practical value
1) Numerical values concerning standard-size mail	
TEIKEI_K1; Standard-size mail's maximum thickness →	10 mm
TEIKEI_K2; Standard-size mail's maximum width →	120 mm
TEIKEI_K3; Standard-size mail's maximum length →	235 mm
TEIKEI_J; Standard-size mail's maximum weight →	50 g
2) Numerical values concerning ranges treated as mail	
GAI_K1 ; Mail's minimum width →	90 mm
GAI_K2 ; Mail's minimum length →	140 mm
GAI_K3 ; Mail's maximum length →	600 mm
GAI_K4 ; The maximum total length of three sides of a piece of mail →	900 mm
GAI_J ; Mail's maximum weight →	4000 g
3) Numerical values concerning weight	
JURYO_T1 ; Standard-size mail's threshold →	25 g
JURYO_G1 ; Nonstandard-size mail's threshold 1 →	50 g
JURYO_G2 ; Nonstandard-size mail's threshold 2 →	100 g
JURYO_G3 ; Nonstandard-size mail's threshold 3 →	250 g
JURYO_G4 ; Nonstandard-size mail's threshold 4 →	500 g
JURYO_G5 ; Nonstandard-size mail's threshold 5 →	1000 g
JURYO_G6 ; Nonstandard-size mail's threshold 6 →	2000 g
JURYO_G7 ; Nonstandard-size mail's threshold 7 →	3000 g
4) Numerical values concerning postage	
RYOKIN_N1; Postage for standard-size mail (class No. 1) →	62 yen
RYOKIN_N2; Postage for standard-size mail (class No. 2) →	72 yen
RYOKIN_N3; Postage for nonstandard-size mail (class No. 3) →	120 yen
RYOKIN_N4; Postage for nonstandard-size mail (class No. 4) →	175 yen
RYOKIN_N5; Postage for nonstandard-size mail (class No. 5) →	250 yen
RYOKIN_N6; Postage for nonstandard-size mail (class No. 6) →	360 yen
RYOKIN_N7; Postage for nonstandard-size mail (class No. 7) →	670 yen
RYOKIN_N8; Postage for nonstandard-size mail (class No. 8) →	930 yen
RYOKIN_N9; Postage for nonstandard-size mail (class No. 9) →	1130 yen
RYOKIN_N10; Postage for nonstandard-size mail (class No. 10) →	1340 yen
5) Numerical values for special delivery	
RYOKIN_R1; Special delivery rate for standard-size mail (class No. 1) →	272 yen
RYOKIN_R2; Special delivery rate for standard-size mail (class No. 2) →	282 yen
RYOKIN_R3; Special delivery rate for nonstandard-size mail (class No. 3) →	330 yen
RYOKIN_R4; Special delivery rate for nonstandard-size mail (class No. 4) →	385 yen
RYOKIN_R5; Special delivery rate for nonstandard-size mail (class No. 5) →	460 yen
RYOKIN_R6; Special delivery rate for nonstandard-size mail (class No. 6) →	670 yen
RYOKIN_R7; Special delivery rate for nonstandard-size mail (class No. 7) →	980 yen
RYOKIN_R8; Special delivery rate for nonstandard-size mail (class No. 8) →	1500 yen
RYOKIN_R9; Special delivery rate for nonstandard-size mail (class No. 9) →	1700 yen
RYOKIN_R10; Special delivery rate for nonstandard-size mail (class No. 10) →	1910 yen
6) Numerical values for postcard	
HAGAKI_K1; Maximum width of postcard →	107 mm
HAGAKI_K2; Maximum length of postcard →	150 mm
HAGAKI_NO; Postage for postcard (class No. 0) →	41 yen
HAGAKI_RO; Special delivery rate for postcard (class No. 0) →	251 yen

The processing flow of FIG. 37 will be described. From the size data and the thickness data obtained at the physical quantity detection section, the minimum, intermediate value, and maximum of three sides of a piece of mail, and the total length of the three sides are computed. The width, length, and thickness information items are stored as KEIJO_W, KEIJO_H, and KEIJO_T in the temporary memory section 115, respectively. The minimum value obtained through calculation, the intermediate value, the maximum value, and the total of three sides are stored as KEIJO_MIN, KEIJO_MID, KEIJO_MAX, and KEIJO_TTL in the temporary memory section 115, respectively (S3601). The threshold data items in TEIKEI_K1 to K4 in the postage LUT 121 are compared with the above values (S3602). If none of the values exceed the threshold values, it is determined whether or not the intermediate value and the maximum value of three sides are equal to or larger than the threshold values in GAI_K1 and GAI_K2 in LUT (S3603). If they are equal to or larger than the threshold values, it is determined that the piece of mail is standard-size mail. Then, the weight measurement JURYO stored in the temporary memory section 115 is compared with the standard-size mail weight threshold JURYO_T1 to classify the piece of mail as one of the two subdivisions (S3604). If the weight is lower than the threshold value, the intermediate value and the maximum value of three sides are compared again with the maximum width HAGAKI_K1 and the maximum length HAGAKI_K2 of postcard (S3606). If both are lower than the threshold

values, it is determined to be a postcard, and the postage for postcard RYOKIN_NO is read and stored in RYOKIN_LUT in the temporary memory section **115** (see FIG. **19**). Similarly, the rate for special delivery postcard RYOKIN_NO is read and stored in RYOKIN_RPD in the temporary memory section **115**. Then, after "0" indicating class No. **0** (see FIG. **36**) is written in YUBIN_KIND (S**3607**), the process is terminated.

If it is determined to be class No. **1** by the comparison at step S**3606**, the following values are set at specific addresses in the temporary memory section **115** (S**3608**):

RYOKIN_LUT←RYOKIN_N1

RYOKIN_RPD←RYOKIN_R1

YUBIN_KIND←"1"

Similarly, if it is determined to be class No. **2** by the comparison at step **3604**, the following values are set at specific addresses in the temporary memory section **115** (S**3605**):

RYOKIN_LUT←RYOKIN_N2

RYOKIN_RPD←RYOKIN_R2

YUBIN_KIND←"2"

Since the piece of mail judged to be nonstandard-size mail at step S**3603** does not reach the size treated as mail, "11" indicating nonmail is written in YUBIN_KIND (S**3609**). Then the process is terminated.

If it is determined to be nonstandard-size mail at step S**3602**, the maximum size value KEIJO_MAX is compared with the threshold value GAI_K3 in the postage LUT **121**, and the total of three sides KEIJO_TTL is compared with the threshold GAI_K4. If both are lower than the thresholds, they are determined to be nonstandard-size mail; otherwise, they are determined to be nonmail (S**3610**). In the case of nonmail, "11" is written in YUBIN_KIND (S**3611**) as at step S**3609**. Then, the process is terminated. If they are detected to be nonstandard-size mail, JURYO indicating the weight of mail is compared with JURYO_G1 to JURYO_G7 in the postage LUT **121** to determine which of class No. **3** to No. **10** they fall under (S**3612**). As in standard-size mail, suitable data items are set by type in RYOKIN_LUT, RYOKIN_RPD, and YUBIN_KIND (S**3613**) in the temporary memory section **115**.

The process of evaluating the validity of charges and obtaining mail division information from the type information items classified according to the size and weight of mail and the charge information obtained from the image information on the postal indicia will be described, referring to the flowchart of FIG. **39**. The following processing programs are stored in the program storage section **114**.

The rate RYOKIN_LUT determined from the physical quantities of mail, the charge RYOKIN_RPD for special delivery, and the total charge RYOKIN_TTL obtained from the image information on the postal indicia are read from the temporary memory section **115** (S**3801**). Next, kind information YUBIN_KIND obtained from the physical quantities of mail is read from the temporary memory section **115** (S**3802**). When the value of YUBIN_KIND is "11," since the object is determined to be nonmail, "5" indicating reject is set in KUBUN_KIND in the temporary memory section **115** (S**3803**, S**3804**). If KUBUN_KIND has a value other than "11," RYOKIN_LUT is compared with RYOKIN_TTL (S**3805**) to judge whether or not the charge on the postal indicia is valid. When the former is larger, it means that the charge is insufficient. In the above-mentioned process of discriminating postal indicia, because "0" is written in RYOKIN_TTL for mail whose postage is unknown but not insufficient, such as separately paid mail or postpaid mail, RYOKIN TTL is checked (S**3806**). If "0" is written there, operation proceeds to step S**3811**. If "−1" is written there, it means that no postal indicia has been detected. Thus, it is determined that rate="0," valid charge RYOKIN_LUT is set as postage due in SAGAKU in the temporary memory section **115** (S**3814**), and "3" meaning postage due is set in KUBUN_KIND (S**3808**). Otherwise, it is judged that the postal indicia is present but the postage is insufficient. In this case, after the difference between the current postage and the valid postage RYOKIN_LUT is calculated and stored in SAGAKU in the temporary memory section **115** (S**3807**), "3" is set in KUBUN_KIND (S**3808**).

If it is determined that the postage is equal to or greater than the standard charge at step S**3805**, then it is checked whether the postage is equal to or larger than the special delivery charge (S**3809**). If it is greater than the special delivery charge, "4" meaning special delivery is set in KUBUN_KIND (S**3810**). In other cases, KUBUN_KIND indicating the mail type is read (S**3811**) If the value is "0", "1" or "2," "1" meaning standard-size mail is set in KUBUN_KIND; otherwise "2" meaning unknown-size mail is set there (S**3812**, S**3813**). FIG. **40** shows the relationship between the values of KUBUN_KIND and types of mail classified.

Explained next will be the process of giving a division instruction or a stamp instruction to the operation instructing section on the basis of mail division information. The following program is stored in the program storage section **114**. FIG. **41** shows the processing flow. First, KUBUN_KIND in the temporary memory section **115** is read (**4001**) and, on the basis of the value, the contents of the process are determined. The process will be explained by the kind of mail.

(1) When KUBUN_KIND="1" (standard-size mail)

The positional information on the postal indicia obtained from the process of discriminating postal indicia and the total postage RYOKIN_TTL are read (**4002**). If the postage is not "0," at step **4003** it is necessary to put a postmark. Thus, a stamp instruction is sent to the postmark stamping means **126** on the basis of the positional information on the postal indicia and the detection signal from the mail position detector **125** placed near the postmark stamping means **126** (**4004**). If the postage is "0" at step **4003**, the process proceeds to step **4005**. Then, a transport path switching instruction is sent to the mail distribution means **128***a* (see FIG. **2**) (**4005**), and pieces of mail are collected in the mail stacker **129***a* (**4006**). Then, the process is terminated.

(2) When KUBUN_KIND="2" (nonstandard-size mail)

Sending a postmark stamping instruction is effected in the same manner as in item (1) (standard-size mail), except that the object to which a transport path switching instruction is sent is changed to distributor **128***b* and that the mail stacker is changed to stacker **129***b*.

(3) When KUBUN_KIND="3" (postage due)

The postal indicia portion is postmarked on the basis of the positional information on the postal indicia obtained from the process of discriminating postal indicia (**4007**), and a transport path switching instruction is sent to the mail distribution means **128***c* (**4008**). Then, a mark meaning postage due is stamped by the postage due mark stamping means **127** in a specific position of mail between the mail distribution means **128***c* and the stacker **129***c* (**4009**). This mark is stamped so that the operator of an automatic mail processor or the postman can recognize it with the naked eye even if a piece of mail with postage due piece of mail is mixed with other pieces of mail. The mark may always be the same. For example, postage due data SAGAKU stored in the temporary memory section **115** may be read to include the value in the mark. The piece of mail stamped with a postage due mark is collected in the stacker **129***c* (**4010**).

(4) When KUBUN_KIND="4" (special delivery)

Sending a postmark stamping instruction is effected in the same manner as in item (3), except that the object to which a transport path switching instruction is sent is changed to **128***d* and that the mail stacker is changed to **129***d*. In the present system, a judgment of special delivery is made on the basis of postal rates only. To improve the detection accuracy, for example, a system may be considered which extracts the special delivery mark or characters on mail by means of character recognition such as an OCR or a pattern matching process described in the process of discriminating postal indicia in the present invention.

(5) When KUBUN_KIND="5" (reject)

When it is determined to be nonmail, a transport path switching instruction is given to neither of the mail distribution means **128**. Thus, the object goes straight on the transport path and is collected in the stacker **129***e* (**4011**).

An example of the postmark stamping means **126** is shown in FIG. **49**. A print hub **4801** on whose side a print pattern is drawn and a backup roller **4802** for pressing a piece of mail against the hub from the opposite direction are arranged. The piece of mail gets caught between transport belts (not shown) and is conveyed on a mail guide **4804**. An ink roller **4803** is pressed against the print hub **4801**, on the opposite side of the transport path, thereby always supplying ink to the print hub **4801** for stamping. A print shaft **4805** transmits the rotational movement of a driving source (not shown) to the print hub **4801**.

Hereinafter, the processing flow during stamping will be explained. At the moment when it is detected that the postal indicia portion of the piece of mail has reached between both rollers on the basis of the positional information on the postal indicia and the detection signal from the mail position detector **125** placed near the postmark stamping means **126**, a driving source (not shown) starts by the instruction from the CPU **113**, thereby rotating the print shaft **4805**. In a stationary state, since the print hub **4801** faces the ink roller **4803**, it is apart from the backup roller **4802**. When rotated by the driving source, the printing surface of the print hub **4801** is pressed against the backup roller **4802** with the piece of mail caught between them. As a result, a postmark is put on the postal indicia. After the print shaft turns once, it stops by application of electromagnetic brake **4806** in the position where it was before the operation to prepare for the next stamping.

The postage due mark stamping means **127** can be realized with the same construction as that of the post-mark stamping means **126**.

An example of the mail distribution means **128** is shown in FIG. **50**. A piece of mail gets caught between a transport belts **4901***a* and **4901***b* and reaches a transport path switching section **4902**. A sort-out plate **4903** swings through an angle almost equal to the angle between branch paths **4904***a* and **4904***b* to distribute pieces of mail to two paths. The sort-out plate **4903** is driven by, for example, a magnetic solenoid (not shown), and usually remains stationary in the position indicated by a solid line in FIG. **50**. To cause the piece of mail to branch as a result of verifying the physical quantities with the postal rates, at the moment when it is determined that the piece of mail is approaching the vicinity of the transport path switching section **4902** on the basis of the detection signal from the mail position detector **125** (not shown) placed near the mail distribution means **126**, current is allowed to flow through the electromagnetic solenoid by the instruction from the CPU **113**, thereby causing the sort-out plate **4903** to swing to the position indicated by a broken line to allow the piece of mail to branch. After the mail position detector **125** (not shown) detects that the piece of mail has passed through the transport path switching section **4902** completely, the sort-out plate **4903** is returned to the solid-line position. Then, the process is terminated.

Hereinafter, a statistical process on mail will be described. As an example of statistical data, it is possible to take at least one of the following: statistics on the number of pieces of mail and on the total postage processed by the present system, statistics on the number of pieces of mail and on the total postage by type as shown in FIG. **36**, statistics on the number of pieces of mail and on the total postage by processing division as described above, statistics on the number of pieces of mail by physical quantity, statistics on the number of pieces of mail by postage, and statistics on the number of pieces of mail by kind of postal indicia. There are two statistical data managing methods: one is to change data on the relevant item among the statistical data values as described above each time each object is processed, and the other is to store the process result for each object and then calculate the individual statistical data values in unison.

A case where statistical data is managed by the former method will be explained. To execute the process, the program storage section **114** stores, for example, the processing procedures as shown in FIG. **43**.

After the mail position detector **125** etc. have detected that the piece of mail has exited the thickness sensor **106** ("YES" obtained at step **4201**), statistical data is gathered at step **4202**, and it is determined whether a specific period of time (e.g., a specified date or one year) has elapsed, or whether the time required to process the pieces of mail in a lot has elapsed (step **4203**). If it has not elapsed yet ("NO" at step **4203**), process is returned to step **4201**, and the processes are repeated until a piece of mail is detected. If it has elapsed, the process is terminated.

The statistical data acquisition means at step **4202** not explained above differs according to what is used as statistical data. Hereinafter, a case where various statistics such as the following are acquired will be explained: the total number of pieces of mail and the total postage for each of class **0** to class **10** in YUBIN_KIND indicating the type of mail as shown in FIG. **36**, the total number of pieces of mail and the total postage for **4** and **3** in process division type KUBUN_KIND indicating special delivery and postage due, the total number of pieces of mail for **5** in process

division type KUBUN_KIND indicating reject, and the total number of pieces of mail and the total postage except when process division type KUBUN_KIND is 5. These individual statistics are stored in the data storage section **116**, beginning with the start address as shown in FIG. **42**. These statistics are all initialized to 0 when the system operates for the first time. After such a management process is completed or after those statistics are copied to another recording medium periodically, those statistics may be cleared to 0.

To acquire statistical data, the program storage section **114** stores the processing procedures as shown in FIGS. **46** and **47**, for example. First, the processing procedure in FIG. **46** will be explained.

A check is made to see if the value of KUBUN_KIND is equal to **5**, or the piece of mail should be rejected (step **4501**). If it should be rejected, the total number of rejects stored in the four-byte area starting at address **68***h* is increased by 1 (step **4508**), and then the process is terminated. If it should not be rejected, a check is made to see if the value of KUBUN_KIND is equal to 4, or the piece of mail is special delivery (step **4502**). If it is special delivery, the total number of special delivery items stored in the four-byte area starting at address **58***h* is increased by 1 (step **4506**), postage RYOKIN_TTL is added to the total special delivery charges stored in the four-byte area starting at address 5Ch (step **4507**), and then the process is terminated. If it is not special delivery, a check is made to see if the value of KUBUN_KIND is equal to 3, or the piece of mail is postage due (step **4503**). If it is postage due ("YES" in step **4503**), the process advances and, the total number of postage-due pieces of mail stored in the four-byte area starting at address **60***h* is increased by 1 (step **4504**), postage difference SAGAKU is added to the amount of postage due for the total of postage due pieces of mail stored in the four-byte area starting at address **64***h* (step **4505**), and then the process is terminated. If no postage is due ("NO" in step **4503**), the process terminates immediately.

Hereinafter, the processing procedure of FIG. **47** will be described. The total number of pieces of mail in YUBIN_KIND stored in the four-byte area starting at the (8×the value of YUBIN_KIND+1)-th byte is increased by 1 (step **4601**), and postage RYOKIN_TTL is added to the total postage in YUBIN KIND stored the next 4-byte area (step **4602**). At step **4603**, the total number of pieces of mail stored in the four-byte area starting at address 6Ch is increased by 1, and postage RYOKIN_TTL is added to the total postage stored in the four-byte area starting at address **70***h* (step **4604**). Then, the process is terminated.

Statistics other than those described above are also acquired in a similar manner. For example, to obtain the statistic by the type of postal indicia, INMEN_KIND is used instead of YUBIN_KIND at step **4601** to increase the number of pieces of mail for each value of INMEN_KIND by 1. By suitably determining division ranges on the basis of the physical quantities including a piece of mail's width information KEIJO_W, length information KEIJO_H, thickness information KEIJO_T, and weight measurement JURYO, statistics concerning physical quantities can be acquired in a similar manner. In addition, among the above-described statistics, statistics can be obtained similarly even in such a combination as allows at least one statistics to be obtained.

Hereinafter, a case where statistical data is managed by the latter method will be explained. To execute this process, the program storage section **114** stores the processing procedure as shown in FIG. **45**.

The process of step **4401** repeats until a piece of mail passes out of sensor **106** (while "NO" is obtained at step **4401**). When a piece of mail is detected in step **4401** the individual process results such as RYOKIN_TTL stored in the temporary memory section **115** are stored together with mail identification information YUBIN_ID as shown FIG. **44** in the data storage section **116** (step **4402**). For example, the value of identification information YUBIN_ID for the first processed piece of mail is "1", and similarly, the value of identification information YUBIN_ID for the i-th processed piece of mail is "i." The individual process results are stored in the 22-byte area starting at address RESULT_OFF+22×i, and the value of YUBIN_ID is stored in RESULT_CNT indicating the total number of processed pieces of mail in the four-byte area starting at address RESULT_OFF. Next, after step **4403** similar to step **4203** of FIG. **43** has been executed, control proceeds to the next step **4404**. At step **4404**, on the basis of the process results for each piece of mail stored at step **4402**, the relevant statistical data items in a statistical data storage area (similar to FIG. **42**) beginning with the start address as shown in FIG. **44** are changed sequentially. This process is repeated as many times as the value of RESULT_CNT (while "NO" is obtained in step **4405**). Otherwise, if "YES" is obtained at step **4405**, the process terminates.

Hereinafter, the process of outputting to the data output section **123** the physical information on pieces of mail, including the size and weight, the image information, the type information, the division information, the postage information, and mail discriminating results such as the value of statistical data will be described with reference to FIG. **48**. The following processing program is stored in the program storage section **114**.

After the data output section **123** has displayed specific character information items in specific positions on, for example, a CRT, the values of a piece of mail's width information KEIJO_W, length information KEIJO_H, thickness information KEIJO_T, and weight measurement value JURYO stored in the temporary memory section **115** are displayed in the places indicated by reference numerals **4701** to **4704** in FIG. **48**. When the value of YUBIN_KIND indicating the type of mail stored in the temporary memory section **115** is "0," the object is a post card, so that location **4705** is given; when the value is "1" or "2," location **4706** indicating standard-size mail is given; when the value is any one of "3" to "10," location **4707** indicating nonstandard-size mail is given; furthermore, when the value is "11," location **4708** is given. Then, the characters displayed in the corresponding locations are made brighter or colored. When the value of KUBUN_KIND indicating the mail processing division stored in the temporary memory section **115** is "4," the characters displayed in location **4710** indicating special delivery, otherwise in location **4709** are made brighter or colored. In FIG. **48**, location **4707** and location **4709** are selected. Then, the value of total postage RYOKIN_TTL obtained from the image information on the postal indicia stored in the temporary memory section **115** and that of valid postage RYOKIN_LUT are displayed in location **4711** and location **4712**. Furthermore, the value obtained by subtracting RYOKIN_LUT from RYOKIN_TTL is displayed in location **4713**. In this way, the operator is informed of the results of detecting the object. Similarly, the mail image information stored in the mail image memory **118** and the statistical data items stored in the data storage section **116** can also be displayed.

The data communication section **124** in the input/output section is an apparatus for linking with an external commu-

nication line such as a modem and transmitting data. Using the data communication section **124**, the host computer can pump up statistical data items including the total number of processes per day and the amount of money processed. Furthermore, when a new postal indicia such as a commemorative stamp is issued, it is possible to update the dictionary in the postal indicia dictionary memory **120** using the communication line.

While in the embodiment, the invention has been applied only to domestic first-class mail and second-class mail, it is not limited to these. For instance, the invention may be applied to third-class mail and fourth-class mail, and further to ordinary packages, bookrate packages, and home delivery service. Although in the embodiment, postage is determined only by physical information and special delivery information on the mail, the invention may be applied to a postage system where postage differs with the destination or the days required for delivery, such as a postage system applied to overseas mail, without departing from the scope of the invention.

In addition to a method of weighing a load, the weight sensor **105** produces a similar result by a method of forcing the object to collide with a barrier provided in the transport path and measuring the impulse and the speed to determine the weight. The optical read sensor **103** may be a two-dimensional area sensor instead of a one-dimensional sensor. Furthermore, of the image information items obtained by the sensor **103**, the values obtained by converting YUBIN_W and YUBIN_H indicating the outer appearance of a piece of mail into units of length may be determined to be KEIJO_W and KEIJO_H indicating mail's shape information. In this case, the size sensor **104** and the size detecting section **110** are not necessary. The sensor **103** may be a color read sensor. In this case, color information may be sensed as a physical quantity of an object, which enables the invention to be applied to a system where postage differs with the color of an object, for example.

While in the embodiment, the transport path is achieved by a belt, the object does not necessarily move. For example, the invention may be applied to a measuring instrument which senses the weight and size of a piece of mail at a window in a post office and displays the postage.

As described above in detail, with the present invention, by measuring the physical information on an object in connection with postage, such as the size, thickness, and weight, calculating the valid postage on the basis of a postage table for the physical quantities previously stored, and discriminating the postage on the postal indicia on the object through an image information process, it is determined whether or not the valid postage determined by the physical information has been paid. According to the result, the object can be classified. Statistical data on each type or on the postage for all objects or the number of pieces of mail can be measured. Furthermore, an indicator can be used to display the detected result.

Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details, and representative devices shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

What is claimed is:

1. A mail processing apparatus comprising:

means for detecting physical quantities of mail provided with a stamp so as to determine a processing charge of the mail;

first determining means for determining the processing charge of the mail in accordance with the physical quantities detected by said detecting means;

means for storing a plurality of reference images corresponding to images of a plurality of stamps of different postal indicia;

means for extracting the images of the stamps of the mail;

second determining means for determining a postal indicia of the stamp of the mail by comparing the image extracted by said extracting means with the plurality of reference images stored in said storing means;

means for verifying the processing charge determined by said first determining means and the postal indicia of the mail determined by said second determining means; and

third determining means for determining a processing method of the mail based on a verification result obtained by said verifying means.

2. A mail processing apparatus according to claim **1**, wherein said first determining means comprises means for storing a conversion table denoting a relationship between the physical quantities of the mail and the processing charge; and means for determining the processing charge of the mail from the physical quantities detected by said detecting means based on the conversion table stored in said storing means.

3. A mail object processing apparatus according to claim **1**, wherein said third determining means comprises means for classifying said mail according to at least one of a physical quantity detected by said detecting means, the determined processing charge, and the validity of the postal indicia affixed on the mail according to the physical quantities.

4. A mail processing apparatus according to claim **1**, wherein said third determining means comprises means for collecting statistical data on said mail by using at least one of said physical quantities obtained from said physical quantity detecting means, said charge, said postal indicia obtained from said second determining means, and a verification result obtained from said verifying means.

5. A mail processing apparatus according to claim **1**, wherein said third determining means comprises means for displaying information items on said mail by using at least one of said physical quantities obtained by said physical quantity detecting means, said charge, said postal indicia obtained from said second determining means, and a verification result obtained form said verifying means.

6. A mail processing apparatus according to claim **1**, wherein said storing means comprises means for fetching stamp reference image data, postal indicia reference identification values data, and mail class reference identification data.

7. A mail processing apparatus according to claim **1**, wherein said second determining means comprises means for comparing each of said image of the stamps with the stored images to obtain a postal indicia corresponding to a reference image most similar to the extracted image; means for fetching the postal indicia obtained as a result of the comparison P reformed by said comparing means; and totalizing means for calculating a total sum of the postal indicia for a plurality of stamps on the mail.

8. A mail object processing apparatus according to claim **7**, wherein said third determining means comprises means for comparing the processing charge obtained by said first determining means with the total sum of the postal indicia by said totalizing means, and determining whether the mail is special mail or ordinary mail.

9. A mail processing apparatus according to claim 7, wherein said fixing means comprises means for determining whether the total sum of the postal indicia of the stamps put on the mail is valid or not, means for putting a postmark indicating "used" on said stamp when the postal indicia affixed on said mail is valid, and means for comparing the processing charge obtained by said first determining means with the total sum of the postal indicia obtained from said totalizing means and putting a postage due mark on the mail.

10. A mail processing apparatus comprising:

physical quantity detecting means for detecting physical information serving as factors that determine processing charges for mail with a stamp, by quantifying the information to obtain physical quantities;

first means for storing a conversion table which shows a relationship between the physical quantities and the charges;

charge determining means for determining a processing charge for said mail with reference to said conversion table on the basis of said physical quantities;

extracting means for extracting image information including the stamp image of said mail;

second means for storing a plurality of reference image data indicating a plurality of stamp images;

means for determining the kind of said stamp image on the basis of the image information extracted by said extracting means using said reference image data;

postal indicia detecting means for detecting the postal indicia from said determined stamps image; and

means for verifying the processing charge for said mail obtained from said charge determining means with the postal indicia affixed on said mail obtained from said postal indicia detecting means.

11. An automatic processing apparatus for mail to be processed, comprising:

means for taking in mail with a stamp put on a surface of the mail to be processed;

a transport path for transporting the mail taken in by said taking means;

physical quantity detecting means having a plurality of sensors which are provided along the transport path in sequence, for detecting a plurality of physical information items serving as factors that determine a processing charge for the mail by quantifying the items to obtain physical quantities;

first means for storing a conversion table representing a relationship between the physical quantities and processing charges;

charge determining means for determining a processing charge for said mail with reference to said conversion table using said physical quantities;

extracting means for extracting image information including the stamp of said mail;

second means for storing a plurality of reference image data items indicating a plurality of stamp images;

means for determining the kind of said stamp image on the basis of the image information extracted by said extracting means using said reference image data;

postal indicia detection means for detecting the postal indicia from said determined stamp image; and

means for verifying the processing charge for said mail obtained from said charge determining means with the postal indicia affixed on said mail obtained from said postal indicia detection means.

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